

CLASS 365, STATIC INFORMATION STORAGE AND RETRIEVAL

SECTION I - CLASS DEFINITION

This is the generic class for apparatus or corresponding processes for the static storage and retrieval of information. For classification herein, the storage system must be (1) static, (2) a singular storage element or plural elements of the same type, (3) addressable.

- (1) Note. Static storage and retrieval of information within this class means that relative motion is not required between the storage element and the source, receiver, or transducer. For dynamic storage and retrieval or magnetic information, see References to Other Classes, below.
- (2) Note. The storage elements within this class are plural elements of the same type which may store one or more bits of information per element.
- (3) Note. The storage system must be addressable, that is, there must be an inherent means for writing information into a memory and a means for reading the same information from the memory. For switching systems, selective systems, card readers, and recorders, see References to Other Classes, below. Static memory systems involving data processing techniques are classified elsewhere.

SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS

A. This class includes static memory systems wherein the information stored in the memory element has electrical, magnetic, or optical properties. This class excludes mechanical or fluidic type storage of information, e.g., card files, cams, levels, or fluids, etc. This class also excludes the storage of noninformation, e.g., energy, basic signal control means, etc.

B. Processes for the manufacturing of storage elements are not classified within this class. See appropriate classes in References To Other Classes, below.

C. Storage Signals, per se, are not classified herein. (See appropriate classes in the References To Other Classes, below.)

D. Circuits not specific to storage and retrieval which may constitute subcombinations of such apparatus are classified in the appropriate class for such circuits, e.g., photosensitive devices. See References to Other Classes, below.

E. The combination of the subject matter of this class and an art environment is classified with the art environment.

F. For static storage and retrieval systems, devices, and arrangements found in other classes: see appropriate classes in Reference To Other Classes, below.

G. The organization of this class can be found in Subclass References to the Current Class, below.

SECTION III - SUBCLASS REFERENCES TO THE CURRENT CLASS

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 1, through 44, for magnetic bubble devices.
- 45, 48, analog storage systems, for devices where the information stored is not digital in nature.
- 49, through 243.5, digital storage systems, for devices where the information is discrete.
- 244, for subject matter not found above.

SECTION IV - REFERENCES TO OTHER CLASSES

SEE OR SEARCH CLASS:

- 29, Metal Working, for method of assembling storage elements. (See Lines With Other Classes, Section B.)
- 29, Metal Working, subclass 25.35 for method of making piezoelectric devices, subclass 737 for apparatus to assemble magnetic memory devices, subclasses 25.01+ for making of barrier layer device, subclasses 592.1+ for processes of mechanical manufacturing electrical devices. (See Lines With Other Classes F.)
- 74, Machine Element or Mechanism, subclasses 568+ for mechanical storage elements. (See Lines Other Classes, F.)
- 148, Metal Treatment, for metal stock materials usable as storage elements. (See Lines With Other Classes, B.)

- 156, Adhesive Bonding and Miscellaneous Chemical Manufacture, for bonding together storage element materials. (See Lines With Other Classes, B.)
- 174, Electricity: Conductors and Insulators, subclasses 250+ for printed circuit elements which are storage panels. (See Lines With Other Classes, F.)
- 178, Telegraphy, subclass 112 for static information stored in the form of a perforated tape. (See Lines With Other Classes, F.)
- 194, Check-Actuated Control Mechanisms, mechanical storage of a check. (See Lines With Other Classes, F.)
- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclass 68 for process of record matrix forming. (See Lines With Other Classes, F.)
- 209, Classifying, Separating, and Assorting Solids, subclasses 212+ for separating components by magnetic repulsion wherein a magnetic pin position may be indicative of information. (See Lines With Other Classes, F.)
- 235, Registers, subclasses 435+ for card readers.
- 235, Registers, subclasses 435+ for coded record sensors, subclass 493 for magnetic records. (See Lines With Other Classes, F.)
- 250, Radiant Energy, subclass 550 for holographic interference pattern analysis, subclass 553 for a matrix of solid-state light sources. (See Lines With Other Classes, F.)
- 250, Radiant Energy, for radiant energy. (See Lines With Other Classes, D, above.)
- 252, Compositions, subclasses 62.51+ for magnetic compositions used as a storage medium. (See Lines With Other Classes, F.)
- 257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), appropriate subclasses, including subclasses 225, 260, 390, 391, 903, 904, and 910 for solid-state static memory or memory element structure, per se. (See Lines With Other Classes, C.)
- 257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), appropriate subclasses, including subclasses 225, 260, 390, 391, 903, 904, and 910 for solid-state static memory or memory element structure. (See Lines With Other Classes, F.)
- 307, Electrical Transmission or Interconnection Systems, subclasses 401+ for saturable reactor systems which include thin film parametrons, logic circuits, electrets, per se, which are switching type devices, rather than storage of information devices and subclass 109 for systems having a capacitor. (See Lines With Other Classes, F.)
- 307, Electrical Transmission or Interconnection Systems, subclasses 112+ for switching systems.
- 310, Electrical Generator or Motor Structure, subclasses 311+ for piezoelectric device, F.)
- 313, Electric Lamp and Discharge Devices, for a cathode-ray tube (CRT) type storage tube. (See Lines With Other Classes, C.)
- 313, Electric Lamp and Discharge Devices, subclasses 391+ for cathode-ray tube storage devices. (See Lines With Other Classes, F.)
- 315, Electric Lamp and Discharge Devices: Systems, for a CRT type storing system. (See Lines With Other Classes, C.)
- 315, Electric Lamp and Discharge Devices: Systems, subclass 8.51 for cathode-ray tube storing systems, subclass 84.51 for discharge device systems which store electrical pulse energy for later retrieval. (See Lines With Other Classes, F.)
- 320, Electricity: Battery or Capacitor Charging or Discharging, subclasses 166+ for a battery or capacitor charging or discharging circuit. (See Lines With Other Classes, F.)
- 324, Electricity: Measuring and Testing, subclasses 43+ for magnetic field testing means, subclasses 111+ for storage of voltages and currents; and subclasses 210+ for testing of magnetic memory elements, per se. (See Lines With Other Classes, F.)
- 326, Electronic Digital Logic Circuitry, appropriate subclasses for digital logic devices. (See Lines With Other Classes, F.)
- 326, Electronic Digital Logic Circuitry, for logic circuits. (See Lines With Other Classes, D, above.)
- 327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 545+ for miscellaneous bias circuits with signal protection or bias preservation. (See Lines With Other Classes, C.)
- 327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, particularly subclasses 199+ for miscellaneous bistable circuits and subclasses 365+ for miscellaneous gating circuits. (See Lines With Other Classes, F.)
- 330, Amplifiers, subclasses 4+ for laser type amplifiers having utility in information storage. (See Lines With Other Classes, F.)

- 330, Amplifiers, for amplifiers. (See Lines With Other Classes, D, above.)
- 333, Wave Transmission Lines and Networks, subclass 4 for plural channel systems with balanced circuits, subclasses 124+ for impedance matching devices, subclass 12 for transmission lines, subclasses 138+ for delay means, subclass 32 for coupling means which include impedance matching means, subclasses 170+ for wave filters with bridge means, subclasses 213+ for negative resistance networks. (See Lines With Other Classes, F.)
- 335, Electricity: Magnetically Operated Switches, Magnets, and Electromagnets, subclasses 209+ for magnets and electromagnets, per se. (See Lines With Other Classes, F.)
- 336, Inductor Devices, for an inductor type storage element. (See Lines With Other Classes, C.)
- 336, Inductor Devices, appropriate subclass for storage element which are inductors. (See Lines With Other Classes, F.)
- 338, Electrical Resistors, subclass 32 for superconductors, per se, having utility as a storage element. (See Lines With Other Classes, F.)
- 340, Communications: Electrical, subclass 146.2 for digital comparator systems, subclasses 825-825.98 for selective systems, particularly subclasses 2.2-2.31 for a channel selecting matrix and subclasses 14.1-14.69 for decoder matrix systems which are used to control a device (See Lines With Other Classes, F.)
- 341, Coded Data Generation or Conversion, appropriate subclasses for code converters (See Lines With Other Classes, D, above.)
- 345, Computer Graphics Processing and Selective Visual Display Systems, subclasses 55+ for display elements arranged in matrix. (See Lines With Other Classes, F.)
- 346, Recorders, appropriate subclass for recorders. Static memory systems involving data processing techniques are classified elsewhere
- 346, Recorders, subclasses 2+ for phenomenal apparatus and processes recording for processes of producing a record in conjunction with the reading of a record, subclasses 74.2+ for magnetically forming a visible image record. (See Lines With Other Classes, F.)
- 347, Incremental Printing of Symbolic Information, subclasses 1+ for processes and apparatus for conveying information by selectively creating on a medium a visibly distinguishable symbol or mark composed of a plurality of portions; subclass 113 for thermoplastic marking. (See Lines With Other Classes, F.)
- 348, Television, subclasses 714+ for details of static storage device which includes the processing of a video signal.
- 353, Optics: Image Projectors, subclasses 25+ for selective data retrieval of stored information viewed by a projection means. (See Lines With Other Classes, F.)
- 358, Facsimile and Static Presentation Processing, subclasses 296 through 304 for facsimile recording. (See Lines With Other Classes, F.)
- 359, Optics: Systems and Elements, subclasses 350+ for infrared and ultraviolet optical elements, subclasses 1+ for holographic records, subclasses 483+ for polarization devices, subclasses 290+ for light control by altering an optical medium, surface, or interface. (See Lines With Other Classes, F.)
- 359, Optics: Systems and Elements, for holographic, polarization, and light control type storage elements. (See Lines With Other Classes, C.)
- 359, Optics: Systems and Elements, for optical elements. (See Lines With Other Classes, D, above.)
- 360, Dynamic Magnetic Information Storage or Retrieval, subclass 112 for Hall effect; subclasses 114.01-114.1 for reproducing only, using light; and subclasses 313-327.33 and 328 for magnetoresistive, magnetostrictive.
- 361, Electricity: Electrical Systems and Devices, for capacitor type storage element. (See Lines With Other Classes, C.)
- 361, Electricity: Electrical Systems and Devices, subclasses 160+ for control circuits for relay devices, subclass 271 for electrostatic capacitors, per se, subclass 600 for housings or mounting assemblies with plural diverse electrical components, subclasses 500+ for electrolytic capacitors, per se. (See Lines With Other Classes, F.)
- 369, Dynamic Information Storage or Retrieval, for phonograph with a static storage system. (See Lines With Other Classes, E.)
- 369, Dynamic Information Storage or Retrieval, appropriate subclasses, subclass 100.1 for the dynamic recording of audio information which may include static storage, particularly subclasses 100+ for photographic storage of information. (See Lines With Other Classes, F.)
- 370, Multiplex Communications, for a multiplex system which include static storage of information. (See Lines With Other Classes, E.)

- 370, Multiplex Communications, subclass 351 for pathfinding or routing, subclass 395.7 for an ATM network with detail of storage access and control, and subclass 531 for magnetic core for storage in multiplex communications which may include a static memory device. (See Lines With Other Classes, F.)
- 372, Coherent Light Generators, appropriate subclasses for laser type oscillators having utility in information storage. (See Lines With Other Classes, Section F.)
- 377, Electrical Pulse Counters, Pulse Dividers, or Shift Registers: Circuits and Systems, for electrical counters and shift registers. (See Lines With Other Classes, F.)
- 399, Electrophotography, subclass 10 for storage of data on the operation of an electrophotographic device (i.e., log report) and subclass 83 for job mode selection with memory. (See Lines With Other Classes, F.)
- 420, Alloys or Metallic Compositions, (see Lines With Other Classes, B.)
- 427, Coating Processes, for coating of storage element materials. (See Lines With Other Classes, B.)
- 427, Coating Processes, subclasses 62, 82, and 100 for superconductor, semiconductor, and piezoelectric products produced, respectively, subclasses 127+ for magnetic base or coating processes. (See Lines With Other Classes, F.)
- 430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, appropriate subclasses for radiation imagery chemistry process, composition, or product used as a storage medium. (See Lines With Other Classes, F.)
- 434, Education and Demonstration, educational devices which may include the storage and retrieval of information. (See Lines With Other Classes, F.)
- 438, Semiconductor Device Manufacturing: Process, for methods of making semiconductor devices. (See Lines With Other Classes, B.)
- 438, Semiconductor Device Manufacturing: Process, for methods of making semiconductor devices. (See Lines With Other Classes, F.)
- 505, Superconductor Technology: Apparatus, Material, Process, subclasses 150+ for high temperature (T_c 30 K) superconducting devices, particularly subclasses 170+ for static information storage or retrieval. (See Lines With Other Classes, F.)
- 706, Data Processing: Artificial Intelligence, subclass 44 for simulating operational functions of living nerve cells.
- 711, Electrical Computers and Digital Processing Systems: Memory, subclasses 1+ for addressing combined with specific memory configurations (e.g., extended, expanded, dynamic, etc.), subclasses 100+ for generalized address forming, and subclasses 200+ for generalized storage accessing and control in a digital data processing system. (See Lines With Other Classes, E.)
- 714, Error Detection/Correction and Fault Detection/Recovery, subclasses 718+ for diagnostic testing of a memory system and subclasses 763+ for digital data error correction during memory access. (See Lines With Other Classes, F.)

SUBCLASSES

1 MAGNETIC BUBBLES:

This subclass is indented under the class definition. Subject matter where the information stored in a magnetic medium is a domain bubble (a single walled magnetic domain having an outer boundary which closes on itself and has a geometry independent of the boundary of the sheet in which it moves, usually in the form of a cylinder).

SEE OR SEARCH THIS CLASS, SUBCLASS:

29, where the information stored is in the form of a strip.

2 Disposition of elements:

This subclass is indented under subclass 1. Subject matter directed to the physical or spatial arrangement, packaging, or chip orientation of the magnetic bubbles.

SEE OR SEARCH CLASS:

29, Metal Working, subclass 737 for the assembly and disassembly apparatus of a bubble domain device, subclass 604 for the process of mechanical manufacture of a bubble domain device.

359, Optics: Systems and Elements, subclass 228 for ferro fluid magnetic bubble.

360, Dynamic Magnetic Information Storage or Retrieval, subclasses 110+ for a domain bubble used as a transducer,

subclasses 131+ for a domain bubble stored on a dynamic record.

3 **Lattice:**

This subclass is indented under subclass 2. Subject matter where the bubble lattice consists of a plurality of rows and columns of bubble domains which occupy a spatial arrangement which is determined to a substantial extent by the interaction between the bubbles.

4 **Decoder:**

This subclass is indented under subclass 1. Subject matter having means to translate one bubble code to another.

SEE OR SEARCH CLASS:

340, Communications: Electrical, subclass 347 for translating analog to digital, digital to analog, or digital to digital.

5 **Logic:**

This subclass is indented under subclass 1. Subject matter wherein a logic function is performed by the bubble domain device.

6 **Rotating field circuits:**

This subclass is indented under subclass 1. Subject matter wherein drive circuits provide rotating in-plane magnetic fields in field accessed bubble domain devices.

(1) Note. This subclass also includes rotating field coil arrangement and structure.

SEE OR SEARCH CLASS:

331, Oscillators, for oscillating drive circuits, per se.

7 **Detectors:**

This subclass is indented under subclass 1. Subject matter where magnetic flux representing the bubble domain information is detected or sensed.

SEE OR SEARCH CLASS:

324, Electricity: Measuring and Testing, subclasses 34+ for magnetic testing.
329, Demodulators, appropriate subclasses for demodulating elements whose resistance or reactance changes in response to an applied magnetic field.

8

Magnetoresistive:

This subclass is indented under subclass 7. Subject matter where the detector includes an element exhibiting a magnetoresistive effect and that element and its associated effect is used to detect or sense magnetic flux from a bubble domain.

SEE OR SEARCH CLASS:

324, Electricity: Measuring and Testing, subclass 46 for determining the characteristics of a magnetic field by a field responsive resistance.
329, Demodulators, appropriate subclasses for demodulating elements whose resistance or reactance changes in response to an applied magnetic field.
335, Electricity: Magnetically Operated Switches, Magnets, and Electromagnets, subclass 215 for magnetostrictive type devices.

9

Hall effect:

This subclass is indented under subclass 7. Subject matter where the detector includes an element exhibiting Hall effect and that element and its associated effect is used to detect or sense magnetic flux from a bubble domain.

SEE OR SEARCH CLASS:

324, Electricity: Measuring and Testing, subclass 45 for determining the characteristics of a magnetic field utilizing the Hall effect.
329, Demodulators, appropriate subclasses for demodulating elements whose resistance or reactance changes in response to an applied magnetic field.

10

Optical:

This subclass is indented under subclass 7. Subject matter wherein the intensity of the flux emanating from the bubble information is determined by directing a beam of polarized light at the information location and detecting the rotation of polarization caused by the flux from a bubble domain.

SEE OR SEARCH CLASS:

359, Optics: Systems and Elements, subclasses 281+ and 484 where the properties of the polarized light beam are changed as a result of a magnetic field.

11 Generators:

This subclass is indented under subclass 1. Subject matter where the bubble domain is generated or nucleated.

- (1) Note. This subclass includes the generation or nucleation of a bubble domain by a beam of polarized light.

12 By splitting:

This subclass is indented under subclass 11. Subject matter where the bubble domain is generated by splitting (replication) an already existing bubble domain.

13 Plural interacting paths:

This subclass is indented under subclass 1. Subject matter where a plurality of paths or channels containing bubble domains interact with each other by attraction or repulsion.

14 Closed loop:

This subclass is indented under subclass 13. Subject matter where the path or channel is in the form of a closed loop.

15 Major-minor:

This subclass is indented under subclass 14. Subject matter where the path or channel is in the form of a major (main) loop and minor (auxiliary) loop.

16 With switch at interacting point:

This subclass is indented under subclass 13. Subject matter where there is a switch (conductor, bubble domain, different coercivity overlay, overlay spacing, etc.) in the path or channel for propagating the bubble domain into a particular path or channel.

17 Idler switch:

This subclass is indented under subclass 16. Subject matter where the switch is of the idler type where a plurality of bubble domains are continuously recirculated until one bubble domain is ejected by an additional bubble

domain that has been injected into the idler switch.

18 Boundary:

This subclass is indented under subclass 13. Subject matter where the bubble domains interact but never cross the boundary located between the paths or channels, the paths or channels may be in the same medium or different mediums.

19 Conductor propagation:

This subclass is indented under subclass 1. Subject matter where the bubble domains are propagated by energizing conductors associated with the bubble domains.

20 Including A.C. signal:

This subclass is indented under subclass 19. Subject matter where at least one of the conductors is energized with an alternating current (A.C.) signal.

21 Three phase signals:

This subclass is indented under subclass 19. Subject matter where a sequence of three conductors are energized by signals 120 out of phase.

22 One's and zero's:

This subclass is indented under subclass 1. Subject matter where the bubble domain information is stored in the medium by its location in relation to a particular element or elements (conductor, overlay, path, or channel, etc.) within the bubble domain device.

23 Plural direction propagation:

This subclass is indented under subclass 1. Subject matter where a single bubble domain may be propagated in more than a single direction such as forward and reverse, horizontal to vertical, or vice versa.

24 Nonsequential:

This subclass is indented under subclass 23. Subject matter where the direction of propagation is altered by a nonsequential drive field.

25 Velocity:

This subclass is indented under subclass 1. Subject matter where the velocity or speed of bubble domain propagation is significant.

- 26 Turns:**
This subclass is indented under subclass 25. Subject matter where the turns or corners between paths or channels are significant.
- 27 Bias:**
This subclass is indented under subclass 1. Subject matter where a magnetic bias field aids in the propagation of bubble domains.
- (1) Note. Excluded are bias fields used for making the size of the domain bubbles stable.
- 28 Variable:**
This subclass is indented under subclass 27. Subject matter where the magnetic bias field is variable.
- 29 Strip domain:**
This subclass is indented under subclass 1. Subject matter where the bubble domain is elongated into the form of a strip.
- 30 In-plane field (nonrotating):**
This subclass is indented under subclass 1. Subject matter where a magnetic field is provided in the direction of the plane of the magnetic bubble storage medium.
- (1) Note. The normal rotating field used for propagating bubbles is not included.
- 31 Different size bubbles:**
This subclass is indented under subclass 1. Subject matter where there are different size bubbles in the same medium or in different mediums.
- 32 Multiple magnetic layer:**
This subclass is indented under subclass 1. Subject matter where there are a plurality of storage layers or the combination of a storage layer and a second nonstorage magnetic layer.
- 33 Magnetic storage material:**
This subclass is indented under subclass 1. Subject matter where the particular material or composition of the storage medium is disclosed.
- (1) Note. This subclass includes mediums of the isotropic type.
- 34 Amorphous:**
This subclass is indented under subclass 33. Subject matter where the storage medium is of the amorphous type.
- 35 Guide structure:**
This subclass is indented under subclass 1. Subject matter where there is an element or elements for guiding a bubble domain along a path or channel, or a guide means outside the path or channel for confining the bubble domain within a particular path, channel, or area.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
3, for confinement (guide structure) means associated with lattice arrays.
32, where bubbles in another medium are used to guide the information bubbles.
- 36 Ion implantation:**
This subclass is indented under subclass 35. Subject matter where the guide structure is formed by ion implantation.
- SEE OR SEARCH CLASS:
427, Coating Processes, subclasses 523+ for the use of ion plating or ion implantation.
- 37 Slots or rails:**
This subclass is indented under subclass 35. Subject matter where the guide structure is a groove or slot in the storage medium or a rail of permalloy on the surface of the storage medium.
- (1) Note. This subclass includes apertures in the storage medium.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
41, where the guide structure is a permalloy overlay in the shape of a circular dot or disc.

- 38 Zigzag:**
This subclass is indented under subclass 35. Subject matter where the guide structure is shaped in a zigzag fashion.
- 39 Overlays:**
This subclass is indented under subclass 35. Subject matter where an overlay of permalloy is used to guide the bubble domain along a path or channel.
- (1) Note. Not included are common permalloy overlays known as T-I bars and Y-I bars.
- 40 On opposite sides of storage medium:**
This subclass is indented under subclass 39. Subject matter where the overlays are on both sides of the storage medium.
- 41 Dots:**
This subclass is indented under subclass 39. Subject matter where the overlay is in the shape of a dot or disc.
- 42 Wedges:**
This subclass is indented under subclass 39. Subject matter where the overlay is in the shape of a wedge, also known as an angelfish.
- 43 Chevrons:**
This subclass is indented under subclass 39. Subject matter where the overlay is in the shape of a chevron; chevrons are shaped like sergeant strips.
- 44 Rectangular bars:**
This subclass is indented under subclass 39. Subject matter where the overlay is in the shape of a rectangular bar.
- (1) Note. Not included at I bars associated with common T-I bars and Y-I bars.
- 45 ANALOG STORAGE SYSTEMS:**
This subclass is indented under the class definition. Subject matter in which the signal is a direct or analogous function of the information or intelligence stored.
- SEE OR SEARCH CLASS:**
- 315, Electric Lamp and Discharge Devices: Systems, subclass 8.51 for cathode-ray tube (CRT) storage.
- 320, Electricity: Battery or Capacitor Charging or Discharging, subclasses 166+ for capacitor charging or discharging, per se.
- 359, Optics: Systems and Elements, subclasses 1+ for analog storage systems where there is a holographic storage medium storing an analog information signal absent any electrical circuitry.
- 370, Multiplex Communications, appropriate subclasses for multiplex switching techniques similar to addressing or the handling of memory information signals.
- 46 Resistive:**
This subclass is indented under subclass 45. Subject matter where the storage element is resistive.
- SEE OR SEARCH THIS CLASS, SUBCLASS:**
- 148, for digital resistive storage elements.
- 47 Thermoplastic:**
This subclass is indented under subclass 45. Subject matter where the storage element is thermoplastic.
- SEE OR SEARCH THIS CLASS, SUBCLASS:**
- 126, for digital thermoplastic storage elements.
- SEE OR SEARCH CLASS:**
- 347, Incremental Printing of Symbolic Information, subclass 113 for electrostatic marking devices in which a latent image is made visible by applying heat to cause plastic deformation of a charged medium.
- 386, Television Signal Processing for Dynamic Recording or Reproducing, subclass 127 for dynamic thermoplastic recording of television signal.

- 48 Magnetic:**
This subclass is indented under subclass 45. Subject matter where the storage element is magnetic.
- SEE OR SEARCH CLASS:
399, Electrophotography, subclass 10 for storage of data on the operation of an electrophotographic device (i.e., log report) and subclass 83 for job mode selection with memory.
- 49 ASSOCIATIVE MEMORIES:**
This subclass is indented under the class definition. Subject matter where the information is retrieved based on content rather than location; associative memories are also referred to as content or tag memories.
- SEE OR SEARCH CLASS:
359, Optics: Systems and Elements, subclasses 1+ for associative storage systems where there is a holographic storage medium storing information absent any electrical circuitry.
711, Electrical Computers and Digital Processing Systems: Memory, subclass 108 for content addressable memory in a memory accessing and control system in a digital data processing system and subclass 128 for associative memory in a hierarchical caching memory accessing and control system in a digital data processing system.
- 50 Magnetic:**
This subclass is indented under subclass 49. Subject matter where the associative memories storage elements are magnetic.
- 51 FORMAT OR DISPOSITION OF ELEMENTS:**
This subclass is indented under the class definition. Subject matter with specific details of the physical or spatial arrangement of the elements.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
52, for hardware associated with storage elements.
63, for wiring paths of storage elements.
- SEE OR SEARCH CLASS:
29, Metal Working, subclasses 592.1+ for the processes of mechanical manufacture of storage elements.
- 52 HARDWARE FOR STORAGE ELEMENTS:**
This subclass is indented under the class definition. Subject matter having mechanical components or parts which assist in the operation of the storage element.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
51, for physical arrangement of storage elements.
63, for connections between storage elements.
- SEE OR SEARCH CLASS:
174, Electricity: Conductors and Insulators, subclasses 50+ for electrical boxes and housings.
361, Electricity: Electrical Systems and Devices, subclasses 600+ for hardware and mounting assembly with plural diverse electrical components.
- 53 Shields:**
This subclass is indented under subclass 52. Subject matter which includes means associated with the storage device for reducing or preventing electric or magnetic coupling.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
206, for noise suppression.
- SEE OR SEARCH CLASS:
307, Electrical Transmission or Interconnection Systems, subclass 91 for magnetic or electrostatic field control shielding coupled to other systems.
330, Amplifiers, subclass 170 for interstage coupling with shielding means.
439, Electrical Connectors, subclasses 607+ for an electrical connector having or providing inductive or capacitive shielding.

- 54 Ground plane:**
This subclass is indented under subclass 52. Subject matter which includes a ground plane as one of the components of the storage device.
- 55 Magnetic:**
This subclass is indented under subclass 52. Subject matter wherein the storage device is magnetic.
- 56 Spacers:**
This subclass is indented under subclass 55. Subject matter which includes means associated with a storage device for separating storage elements or components of the storage device.
- 57 Keeper:**
This subclass is indented under subclass 55. Subject matter which includes a component of the storage device which is made of highly permeable material and is used to focus or concentrate the magnetic flux emanating from the storage device.
- 58 Slot:**
This subclass is indented under subclass 55. Subject matter where a groove or slot is located within one of the components of the storage device or the storage element itself.
- 59 Embedded conductor:**
This subclass is indented under subclass 55. Subject matter wherein a conductor is embedded within one of the components of the magnetic device or the magnetic element itself.
- 60 Air gap:**
This subclass is indented under subclass 55. Subject matter where an air gap or an air gap space filled with a material which has a permeability of about one is located within the storage element, within components associated with the device or between the element and components.
- 61 Hairpin conductor:**
This subclass is indented under subclass 55. Subject matter where a conductor associated with the storage device has the general shape of a hairpin.
- 62 Permanent magnet:**
This subclass is indented under subclass 55. Subject matter where a permanent magnet is used as a component in the magnetic storage device.
- SEE OR SEARCH CLASS:
335, Electricity: Magnetically Operated Switches, Magnets, and Electromagnets, subclass 209 for magnets, per se.
- 63 INTERCONNECTION ARRANGEMENTS:**
This subclass is indented under the class definition. Subject matter having physical paths by which information is transferred to, from, or between storage elements.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
189.01+, for reading or writing information from or into a static memory device.
- 64 Optical:**
This subclass is indented under subclass 63. Subject matter in which optical elements or paths are used to contact storage elements.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
215, for reading and writing a memory location with an optical beam.
234, for locating a memory location with an optical beam.
- SEE OR SEARCH CLASS:
250, Radiant Energy, subclass 227 for pre-photocell system which includes light conducting rods, subclass 551 for optical/electrical signal isolators, subclass 553 for solid-state light source with an array or matrix of photocells.
359, Optics: Systems and Elements, subclasses 1+ for storage systems where there is a holos:graphic storage medium storing information signals absent any electrical circuitry.
385, Optical Waveguides, appropriate subclasses for light transmitting fibers, rods, or pipes.

65 Ferroelectric:

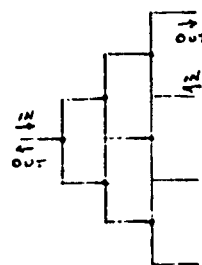
This subclass is indented under subclass 63. Subject matter where the interconnected storage elements are ferroelectric devices.

SEE OR SEARCH THIS CLASS, SUBCLASS:

109, and 117, for ferroelectric memories involving radiant energy.
145, for other ferroelectric memories.

SEE OR SEARCH CLASS:

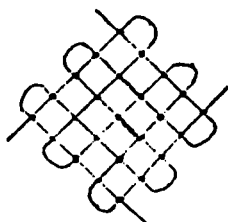
349, Liquid Crystal Cells, Elements and Systems, subclasses 37, 49, and 172+ for light control in ferroelectric liquid crystal devices.
359, Optics: Systems and Elements, subclasses 245+ for light control with ferroelectric devices and subclass 484 for polarization using ferroelectric devices.

**66 Magnetic:**

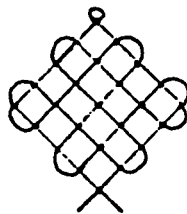
This subclass is indented under subclass 63. Subject matter where the storage elements are magnetic devices.

67 Plural diagonal:

This subclass is indented under subclass 66. Subject matter in which single or plural windings are threaded or coupled to the magnetic elements at an angle of approximately 45 to the row or columns. For example:



plural windings



single winding

68 Tree:

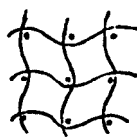
This subclass is indented under subclass 66. Subject matter where the interconnections of the cells are shaped as a divergent branching arrangement with each preceding cell output connected to a plurality of succeeding cells or vice versa. For example:

69 Crossover:

This subclass is indented under subclass 66. Subject matter where a row (column) of cells are interconnected to an adjacent row (column) by mutually crossing over prior to the end of the row (column). For example:

**70 Woven:**

This subclass is indented under subclass 66. Subject matter where the magnetic storage cells are interconnected by windings which are woven as a weft and warp. For example:

**71 Negative resistance:**

This subclass is indented under subclass 63. Subject matter where the interconnected storage elements exhibit negative resistance.

SEE OR SEARCH THIS CLASS, SUBCLASS:

159, for negative resistance storage elements.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 568+ for miscellaneous circuits utilizing a negative resistance device.

72 Transistors or diodes:

This subclass is indented under subclass 63. Subject matter where the interconnected storage elements are transistors or diodes.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

104, 105 and 174+, for particular transistor or diode storage elements.

SEE OR SEARCH CLASS:

257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), appropriate subclasses for transistors and diodes, per se.

327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, appropriate subclasses for miscellaneous circuits using transistors or diodes.

73 RECIRCULATION STORES:

This subclass is indented under the class definition. Subject matter in which the output of a storage element is connected back to its input, i.e., to form a storage loop.

(1) Note. This subclass does not accept shift registers, per se.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

78, for stepwise movement which does not loop the output of a storage element back to its input.

80, for magnetic shift registers which do not have a feedback means.

SEE OR SEARCH CLASS:

370, Multiplex Communications, appropriate subclasses for multiplex switching techniques similar to addressing or the handling of memory information signals.

377, Electrical Pulse Counters, Pulse Dividers, or Shift Registers: Circuits and Systems, subclasses 122, 124 and 126 for ring counters and subclass 129 for pulse counters where the pulse are continuously circulated in a closed loop.

74 Magnetic:

This subclass is indented under subclass 73. Subject matter where the recirculation storage device uses magnetic storage elements.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

80, for magnetic shift registers.

75 Stepwise:

This subclass is indented under subclass 73. Subject matter wherein the information is moved through the memory in a stepwise manner.

76 Delay lines:

This subclass is indented under subclass 73. Subject matter wherein the information is moved through a delay line.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

93, for magnetic shift registers which include a delay means.

194, for read/write circuits which include a delay signal.

SEE OR SEARCH CLASS:

333, Wave Transmission Lines and Networks, subclasses 138+ for delay lines, per se.

77 Plural paths:

This subclass is indented under subclass 73. Subject matter wherein the information is recirculated through plural paths.

SEE OR SEARCH CLASS:

370, Multiplex Communications, subclasses 351+ for pathfinding or routing in multiplex communications which may include a static memory device.

78 PLURAL SHIFT REGISTER MEMORY DEVICES:

This subclass is indented under the class definition. Subject matter in which information flows through two or more shift registers which are used in a static memory system.

SEE OR SEARCH CLASS:

711, Electrical Computers and Digital Processing Systems: Memory, subclasses 109+ for more than nominal recitation of a shift register in combination with accessing and control in a digital data processing environment and subclasses 117+ for hierarchical memory accessing and control.

80 MAGNETIC SHIFT REGISTERS:

This subclass is indented under the class definition. Subject matter where information is transferred (shifted) from one magnetic element to another along an array.

SEE OR SEARCH CLASS:

377, Electrical Pulse Counters, Pulse Dividers, or Shift Registers: Circuits and Systems, subclasses 57 and 64.

81 Bidirectional:

This subclass is indented under subclass 80. Subject matter in which information can be shifted forward or backward.

82 Two cells per bit:

This subclass is indented under subclass 80. Subject matter in which two magnetic elements are required to store a single bit of information.

SEE OR SEARCH THIS CLASS, SUBCLASS:

131, for nonshifting systems which require two elements to store a single bit of information.

83 SiPo/PiSo:

This subclass is indented under subclass 80. Subject matter where the magnetic shift register has a serial input with parallel out or vice versa.

SEE OR SEARCH THIS CLASS, SUBCLASS:

219, for read/write circuits which have serial input with parallel out or vice versa.

84 Core in transfer loop:

This subclass is indented under subclass 80. Subject matter where a magnetic core is located in the transfer loop between the storage elements of the shift register.

85 Continuous:

This subclass is indented under subclass 80. Subject matter having a magnetic shift register where the magnetic element is composed of a continuous material with a plurality of storage positions along its length.

SEE OR SEARCH THIS CLASS, SUBCLASS:

134, for nonshifting systems which use continuous type storage elements.

86 Plated wire:

This subclass is indented under subclass 85. Subject matter having a continuous magnetic element which is a nonmagnetic wire, ribbon, or tube that is coated with a thin magnetic film.

87 Thin film:

This subclass is indented under subclass 80. Subject matter having a magnetic shift register where the device is a thin film cell which has a thickness of approximately 1 to 12,000 angstroms.

SEE OR SEARCH THIS CLASS, SUBCLASS:

86, for magnetic shift register where the element is composed of a continuous thin film material.

171, for a nonshifting system where the element is a thin film material.

88 Domain tip:

This subclass is indented under subclass 87. Subject matter where the magnetic element has a domain in the shape of a tear, "lenticular".

89 Logic:

This subclass is indented under subclass 80. Subject matter where a magnetic shift register is used as a logic device.

- (1) Note. This subclass is limited to logic circuits wherein the magnetic element is used as a storage device.

SEE OR SEARCH CLASS:

- 307, Electrical Transmission or Interconnection Systems, subclasses 406, 407, and 408 for logic circuits which are saturable reactor devices.
- 326, Electronic Digital Logic Circuitry, appropriate subclasses for electronic digital logic circuits.
- 708, Electrical Computers: Arithmetic Processing and Calculating, subclasses 100+ for logic devices which perform mathematical computations.

90 Multiaperture cell:

This subclass is indented under subclass 80. Subject matter having magnetic shift registers where the cell contains two or more apertures for storing information.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 140, for a multiaperture cell used in a non-shifting magnetic system.

SEE OR SEARCH CLASS:

- 307, Electrical Transmission or Interconnection Systems, subclasses 408 and 422 for multiaperture cells in nonlinear reactor systems.

91 Ladder:

This subclass is indented under subclass 90. Subject matter wherein the cell has an array of apertures in the shape of squares or rectangles.

92 With other type core:

This subclass is indented under subclass 90. Subject matter where the magnetic shift register includes multiaperture cells plus other types of storage cells.

SEE OR SEARCH CLASS:

- 711, Electrical Computers and Digital Processing Systems: Memory, subclasses 1+ for addressing combined with specific memory configurations (e.g., extended, expanded, dynamic, etc.) and subclasses 101+ for storage accessing and control of specific memory compositions in a digital data processing system.

93 Including delay means:

This subclass is indented under subclass 80. Subject matter where a magnetic shift register includes a delay network or delay means.

- (1) Note. The mere delay of a signal is not appropriate subject matter for this subclass since all shift registers inherently delay a signal.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 76, for recirculation storage device which includes delay lines.
- 194, for read/write circuits which use a delay signal.

SEE OR SEARCH CLASS:

- 326, Electronic Digital Logic Circuitry, subclasses 93+ for clocking or synchronizing of logic gates or stages.
- 327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, particularly subclasses 261+ and 392+ for miscellaneous circuits utilizing delay.
- 333, Wave Transmission Lines and Networks, subclasses 138+ for passive delay networks.

94 READ ONLY SYSTEMS (I.E., SEMI-PERMANENT):

This subclass is indented under the class definition. Subject matter in which information stored is not usually erased, e.g., destructively stored, as for repetitive readout.

- (1) Note. Read only systems are normally read by an addressing means where coded record sensors are usually scanned spatially.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
120, for information masking.
- SEE OR SEARCH CLASS:
235, Registers, subclasses 435+ for coded record sensors.
337, Electricity: Electrothermally or Thermally Actuated Switches, appropriate subclass for a switch, per se.
340, Communications: Electrical, subclasses 2.2 through 2.31 for a channel selecting matrix and subclasses 14.1-14.69 for a decoder matrix.
- 95 With override (i.e., latent image):**
This subclass is indented under subclass 94. Subject matter wherein the original information may be temporarily overridden, i.e., memory may be operated as read/write with read only information recoverable.
- 96 Fusible:**
This subclass is indented under subclass 94. Subject matter wherein the storage element is a fusible link.
- SEE OR SEARCH CLASS:
257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), subclasses 50, 530 and 928 for shorted, (e.g., anti-fuse, element's).
- 97 Magnetic:**
This subclass is indented under subclass 94. Subject matter where the rod only memory uses magnetic storage elements.
- 98 Random core:**
This subclass is indented under subclass 97. Subject matter in which the storage system is composed of a magnetic matrix where some of the intersections have storage elements and other interconnections do not.
- 99 Random writing:**
This subclass is indented under subclass 97. Subject matter in which the storage system is composed of a magnetic matrix with storage elements at its intersections of which only some are wired.
- 100 Resistive:**
This subclass is indented under subclass 94. Subject matter wherein the storage element is resistive.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
148, for other resistive storage elements.
- 101 Inductive:**
This subclass is indented under subclass 94. Subject matter wherein the storage element is inductive.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
129, for other inductive storage elements.
- SEE OR SEARCH CLASS:
336, Inductor Devices, for inductors, per se.
- 102 Capacitative:**
This subclass is indented under subclass 94. Subject matter wherein the storage element is capacitative.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
149, for other capacitative storage elements.
- 103 Semiconductive:**
This subclass is indented under subclass 94. Subject matter wherein the storage element is a semiconductor.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
174+, for other semiconductor storage elements.
- SEE OR SEARCH CLASS:
438, Semiconductor Device Manufacturing: Process, for methods of making semiconductor memory devices.
- 104 Transistors:**
This subclass is indented under subclass 103. Subject matter wherein the semiconductor storage element includes one or more transistors.

105 Diodes:

This subclass is indented under subclass 103. Subject matter wherein the semiconductor storage element includes one or more diodes.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 115, for radiant energy memory systems which use diodes.
- 175, for other diode storage elements.

106 RADIANT ENERGY:

This subclass is indented under the class definition. Subject matter wherein the condition or state of a memory material or element is altered in accordance with the information stored.

- (1) Note. The material is altered by a radiation beam and/or changes its own state of generating radiation. Information is usually read out electrically, e.g., a semi-conductive material is irradiated to cause it to conduct.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 64, for optical interconnection arrangements.
- 120, for radiant energy storage using informational masking.
- 215, and 234, for optical read/write circuits and addressing circuits, respectively.
- 237, for electron beam addressing.

SEE OR SEARCH CLASS:

- 250, Radiant Energy, for radiant energy devices, per se.
- 257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), subclasses 10, 11, 21, 53-56, 113-118, 184-189, 225-234, 257, 258, 290-294, and 414-470 for radiation-sensitive active semiconductor devices.
- 313, Electric Lamp and Discharge Devices, for lamp and discharge devices, per se.
- 315, Electric Lamp and Discharge Devices: Systems, for lamp and discharge systems.
- 327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 514+ for miscellaneous circuits effected by light.

- 346, Recorders, subclasses 107.1+ for optical recorders for recording phenomenal information.

- 347, Incremental Printing of Symbolic Information, subclasses 224+ for radiation marking, particularly subclass 264 for record receiver or handling means therefor, subclasses 225+ for scanning apparatus or method for marking information, particularly subclass 262 for record receiver or handling means therefor, and subclasses 129+ for electrostatic recorders including photoscanning device.

- 358, Facsimile and Static Presentation Processing, subclasses 296 through 304 for facsimile recording.

- 359, Optics: Systems and Elements, for optical devices, per se, and systems.

- 369, Dynamic Information Storage or Retrieval, subclasses 100+ for optical sound recorders.

- 386, Television Signal Processing for Dynamic Recording or Reproducing, subclasses 42+ and 128+ for recording or reproducing of television signal using light or beam, subclass 126 for television recording having optical disc, and subclass 127 for dynamic thermoplastic recording of television signal.

107 Chemical fluids:

This subclass is indented under subclass 106. Subject matter wherein the memory material is a chemical fluid.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 45, for analog chemical fluid storage devices.
- 153, for electrochemical storage elements not using radiant energy.

SEE OR SEARCH CLASS:

- 205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclass 68 for recording devices.
- 252, Compositions, subclass 62.2 for chemical fluids, per se, used in electrical devices.

- 324, Electricity: Measuring and Testing, subclass 94 for measuring electricity with a chemical fluid.
- 430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, appropriate subclasses for radiation sensitive compositions and elements.
- 108 Liquid crystal:**
This subclass is indented under subclass 106. Subject matter wherein the memory material is a liquid crystal, i.e., pneumatic liquid crystal.
- SEE OR SEARCH CLASS:
345, Computer Graphics Processing and Selective Visual Display Systems, subclasses 38, 50+, and 87+ for liquid crystal display devices with selective electrical control means for providing a human sensible image or message to be displayed.
349, Liquid Crystal Cells, Elements and Systems, appropriate subclasses for light control with liquid crystal materials.
- 109 Photoconductive and ferroelectric:**
This subclass is indented under subclass 106. Subject matter wherein the memory element has both photoconductive and ferroelectric properties and/or materials.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
112, for photoconductive memory elements.
117, for ferroelectric memory elements using radiant energy.
145, for ferroelectric memory elements not using radiant energy.
- 110 Electroluminescent and photoconductive:**
This subclass is indented under subclass 106. Subject matter wherein the memory element has both solid-state electroluminescent and photoconductive properties and/or materials.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
111, for electroluminescent memory elements.
112, for photoconductive memory elements.
- 111 Electroluminescent:**
This subclass is indented under subclass 106. Subject matter wherein the storage material is a solid-state electroluminescent material.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
120, for information masking storage where the electroluminescent element is used as a radiation source and not to store information.
- SEE OR SEARCH CLASS:
250, Radiant Energy, subclasses 458.1+ for luminophor irradiation, subclasses 483.1+ for luminescent devices.
340, Communications: Electrical, foreign art collections FOR 281-282 for a selective electroluminescent element matrix.
345, Computer Graphics Processing and Selective Visual Display Systems, subclasses 36, 45, and 76+ for electroluminescent display devices combined with selective electrical control means for producing a human sensible image or message.
399, Electrophotography, subclass 158 for image reproduction and display therefore.
- 112 Photoconductive:**
This subclass is indented under subclass 106. Subject matter wherein the storage material is a photoconductive material.
- SEE OR SEARCH CLASS:
250, Radiant Energy, subclasses 200+ for photosensitive cells and circuits.
327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 514+ for miscellaneous light sensitive circuits.
- 113 Amorphous:**
This subclass is indented under subclass 106. Subject matter wherein the storage material can be changed from a crystalline (ordered) structure to an amorphous (disordered) structure by means of radiant energy.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

163, for amorphous storage elements using electrical properties.

SEE OR SEARCH CLASS:

257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), appropriate subclasses, especially subclasses 2 through 5, 16, 52 through 63, 646, and 650 for amorphous material devices.

114 **Semiconductive:**

This subclass is indented under subclass 106. Subject matter wherein the storage material is a semiconductor.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

174, for semiconductive storage elements not involving radiant energy.

115 **Diodes:**

This subclass is indented under subclass 114. Subject matter wherein the semiconductive storage device includes one or more diodes.

SEE OR SEARCH CLASS:

250, Radiant Energy, subclass 533 for photocells with solid-state light-emitting diodes in the configuration of an array or matrix.

116 **Plasma:**

This subclass is indented under subclass 106. Subject matter wherein the storage element is a gaseous discharge device.

SEE OR SEARCH CLASS:

313, Electric Lamp and Discharge Devices, for appropriate discharge device, per se.

315, Electric Lamp and Discharge Devices: Systems, subclass 169.4 for gas display panel device with energizing means.

345, Computer Graphics Processing and Selective Visual Display Systems, subclasses 37, 41+, and 60+ for gaseous discharge display devices combined with selective electrical control

means for providing a human sensible image or message to be displayed.

117 **Ferroelectric:**

This subclass is indented under subclass 106. Subject matter wherein the storage element is a ferroelectric material.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

109, for ferroelectric plus photoconductive radiant energy storage elements.

121, for storage of information using informational masking with polarization wherein the polarizer may be a ferroelectric device.

145, for ferroelectric memory elements not involving radiation.

SEE OR SEARCH CLASS:

359, Optics: Systems and Elements, subclasses 245+ for light control with ferroelectric devices and subclasses 484 for polarization using ferroelectric devices.

118 **Electron beam:**

This subclass is indented under subclass 106. Subject matter wherein the memory material has its state changed by radiant energy which is an electron beam.

(1) Note. This subclass will accept cathode-ray tube (CRT) storage with random access means.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

128, for memories using electron beams for information masking, e.g., CRT with masking means.

217, for read/write circuits for an electron beam storage system.

237, for addressing a memory with an electron beam.

SEE OR SEARCH CLASS:

250, Radiant Energy, appropriate subclass for electron beam devices, particularly subclasses 492.1+ for irradiating of objects or materials.

313, Electric Lamp and Discharge Devices, subclass 391 for CRT storage device, per se.

- 315, Electric Lamp and Discharge Devices: Systems, subclasses 8.5+ for electron beam storage systems and subclasses 84.5+ for gaseous discharge tube storage systems.
- 377, Electrical Pulse Counters, Pulse Dividers, or Shift Registers: Circuits and Systems, subclass 99 for counters using beam type tubes.
- 386, Television Signal Processing for Dynamic Recording or Reproducing, appropriate subclass for video signal which includes electron beam devices.
- 119 Color centers:**
This subclass is indented under subclass 106. Subject matter wherein the memory material is a crystal containing local imperfections, which will absorb (or generate) light of a particular frequency (color) depending on the energy level of the electron at the imperfection.
- SEE OR SEARCH CLASS:
349, Liquid Crystal Cells, Elements and Systems, subclasses 69 through 71 for color liquid crystal material used in light control.
- 430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclasses 541+ for radiation sensitive color changing composition.
- 120 INFORMATION MASKING:**
This subclass is indented under the class definition. Subject matter wherein a radiant beam is altered as a function of the information stored, e.g., light beam used to read information stored as transparent and opaque areas in a memory element.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
106, for memories using radiant energy without information masking.
- SEE OR SEARCH CLASS:
235, Registers, subclasses 454+ for sensing records with light beams.
- 346, Recorders, subclasses 107.1+ for optical recorders for recording phenomenal information, subclass 74.1 for magnetic visible image recording.
- 347, Incremental Printing of Symbolic Information, subclasses 224+ for radiation marking, particularly subclass 264 for record receiver or handling means therefor, subclasses 225+ for scanning apparatus or method for marking information, particularly subclass 262 for record receiver or handling means therefor, and subclasses 129+ for electrostatic recorders including photoscanning device.
- 358, Facsimile and Static Presentation Processing, subclasses 296 through 304 for facsimile recording.
- 369, Dynamic Information Storage or Retrieval, subclasses 100+ for optical sound recorders.
- 386, Television Signal Processing for Dynamic Recording or Reproducing, subclasses 30, 38, 108, 117+, 128+ for photographic television recording, subclass 126 for television recording having optical disc, and subclass 127 for dynamic thermoplastic recording or television signal.
- 121 Polarization:**
This subclass is indented under subclass 120. Subject matter wherein the polarization of the radiation beam is altered as a function of the information stored.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
117, for polarization with ferroelectric memory materials.
- SEE OR SEARCH CLASS:
359, Optics: Systems and Elements, subclasses 240+ and 484 for changing the properties of polarized light by an applied field.
- 122 Magneto-optical:**
This subclass is indented under subclass 121. Subject matter wherein the polarization is altered by a memory material which has magneto-optic properties.
- SEE OR SEARCH CLASS:
360, Dynamic Magnetic Information Storage or Retrieval, subclasses 114.01 through 114.1 for dynamic magnetic reproducing only, using light.

123 Bragg cells:

This subclass is indented under subclass 120. Subject matter wherein a Bragg cell is used to diffract a light beam into plural light beams.

124 Diffraction:

This subclass is indented under subclass 120. Subject matter wherein the radiation beam is diffracted as a function of the information stored.

SEE OR SEARCH CLASS:

356, Optics: Measuring and Testing, subclass 450 for measuring systems using diffracted light.

359, Optics: Systems and Elements, subclasses 566+ for diffraction gratings.

125 Holograms:

This subclass is indented under subclass 124. Subject matter wherein object and reference beams are required to store information.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

216, for circuits used to read/write holographic memories.

SEE OR SEARCH CLASS:

235, Registers, subclass 457 for holographic card readers.

359, Optics: Systems (Including Communication) and Elements, subclasses 1+ for storage systems where there is a holographic storage medium storing information signal absent any electrical circuitry.

126 Thermoplastic:

This subclass is indented under subclass 120. Subject matter wherein the radiation beam is altered by different thicknesses of a thermoplastic memory material.

SEE OR SEARCH CLASS:

347, Incremental Printing of Symbolic Information, subclass 113 for electrostatic marking apparatus and processes in which a latent image is made visible by applying heat to cause plastic deformation of a charged medium.

386, Television Signal Processing for Dynamic Recording or Reproducing, subclass 127 for dynamic thermoplastic recording of television signal.

127 Transparency:

This subclass is indented under subclass 120. Subject matter wherein the radiation beam is altered by the transparent and opaque areas of the memory material.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

113, for amorphous memories exhibiting transparency properties.

SEE OR SEARCH CLASS:

235, Registers, subclasses 454+ for optical card readers.

386, Television Signal Processing for Dynamic Recording or Reproducing, subclasses 30, 38, 42+, 108, 117+, and 128+ for photographic television recording, and subclass 126 for television recording having optical disc.

128 Electron beams:

This subclass is indented under subclass 120. Subject matter wherein the radiation beam being altered is an electron beam.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

118, for other electron beam memories.

237, for circuits to direct an electron beam to a memory location.

SEE OR SEARCH CLASS:

250, Radiant Energy, appropriate subclass for electron beam devices.

313, Electric Lamp and Discharge Devices, subclasses 391+ for cathode-ray tube (CRT) storage device, per se.

315, Electric Lamp and Discharge Devices: Systems, subclasses 8.5+ for electron beam storage systems and subclasses 84.5+ for gaseous discharge tube storage systems.

377, Electrical Pulse Counters, Pulse Dividers, or Shift Registers: Circuits and Systems, subclass 99 for counters using beam type tubes.

129 SYSTEMS USING PARTICULAR ELEMENTS:

This subclass is indented under the class definition. Subject matter where the type of storage element used is significant.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

94+, for storage elements used as read only memories.

106+, for storage elements involving radiant energy.

120+, for storage elements involving informational masking.

SEE OR SEARCH CLASS:

257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), appropriate subclasses for particular active solid-state devices which may be found in a static memory device, including subclasses 225, 260, 390, 391, 903, 904, and 910 for solid-state static memory or memory element structure.

313, Electric Lamp and Discharge Devices, for appropriate lamp and discharge devices, per se.

315, Electric Lamp and Discharge Devices: Systems, for particular circuits using appropriate lamp and discharge devices.

327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, appropriate subclasses and particularly subclasses 199+ for bistable devices which may be used in memory cells or arrays.

359, Optics: Systems and Elements, for particular optical elements.

130 Three-dimensional magnetic array:

This subclass is indented under subclass 129. Subject matter where the magnetic storage elements are arrayed in three dimensions.

131 Two magnetic cells per bit:

This subclass is indented under subclass 129. Subject matter where two magnetic elements are used to store a single bit of information.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

82, for two cells per bit magnetic shift registers.

132 Different size cores:

This subclass is indented under subclass 129. Subject matter where at least two of the magnetic elements in the system have different dimensions or a different number of winding turns.

133 Cells of diverse coercivity:

This subclass is indented under subclass 129. Subject matter in which the material of different magnetic elements or the same magnetic element exhibits diverse magnetic properties.

134 Continuous cell:

This subclass is indented under subclass 129. Subject matter where the magnetic element is composed of a continuous material with a plurality of storage positions along its length.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

85, for magnetic shift registers which use continuous cells as its storage elements.

135 Elongated or bar-shaped cell:

This subclass is indented under subclass 134. Subject matter where the cross section of the magnetic storage element is small compared to its length.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

86, for magnetic shift registers which use plated wire as the storage element.

136 Twisters:

This subclass is indented under subclass 135. Subject matter where the magnetic storage element has an easy axis in the helical direction (approximately 45°) or is a wire and is formed in the shape of a helix.

137 Tubular:

This subclass is indented under subclass 135. Subject matter where the magnetic storage element is in the shape of a hollow tube.

138 Chain:

This subclass is indented under subclass 135. Subject matter where the magnetic storage device is an elongated element with circular aperture storage positions along its length.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

91, for magnetic shift registers wherein the storage device is an elongated element with square or rectangular storage apertures.

139 Plated wire:

This subclass is indented under subclass 135. Subject matter having a continuous element which is a nonmagnetic wire or ribbon that is coated with a thin magnetic film.

(1) Note. A wire is considered to be an elongated material of indeterminate length.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

86, for magnetic shift registers which use continuous plated wire as its storage elements.

171, for magnetic thin film storage elements which are not of the continuous type.

140 Multiaperture cell:

This subclass is indented under subclass 129. Subject matter having a magnetic cell which contains two or more apertures for storing information.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

90, for magnetic shift registers which use multiaperture storage cells.

SEE OR SEARCH CLASS:

307, Electrical Transmission or Interconnection Systems, subclasses 408 and 422 for multiaperture cells in nonlinear reactor systems.

141 Apertured plate:

This subclass is indented under subclass 140. Subject matter where a plurality of apertures in a magnetic plate are in a common plane which formulates rows and columns.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

90, for magnetic shift registers which use multiaperture storage cells.

142 Aperture with transverse axis:

This subclass is indented under subclass 140. Subject matter where the axes of the apertures of the multiaperture element are not parallel.

143 Biax:

This subclass is indented under subclass 142. Subject matter where the axes of the aperture are perpendicular.

144 Same size apertures:

This subclass is indented under subclass 140. Subject matter where all of the apertures of the multiaperture element are the same size.

145 Ferroelectric:

This subclass is indented under subclass 129. Subject matter where the storage element is ferroelectric.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

65, for interconnection arrangements which use ferroelectric storage elements.

109, and 117, for ferroelectrics involving radiant energy.

157, for piezoelectric storage devices.

SEE OR SEARCH CLASS:

252, Compositions, subclass 62.9 for a composition designed for use as piezoelectric material.

310, Electrical Generator or Motor Structure, subclasses 311+ for piezoelectric devices.

349, Liquid Crystal Cells, Elements and Systems, subclasses 37, 49, and 172+ for light control in ferroelectric liquid crystal devices.

- 359, Optics: Systems and Elements, subclasses 245+ for light control with ferroelectric devices and subclass 484 for polarization using ferroelectric devices.
- 361, Electricity: Electrical Systems and Devices, subclasses 321.1+ for ferroelectric capacitors, per se.
- 146 Electrets:**
This subclass is indented under subclass 129. Subject matter in which the storage medium is an electret, that is, an element which exhibits a permanent external electrostatic field due to internal polarization.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
145, for ferroelectric storage systems.
147, for persistent internal polarization devices.
- SEE OR SEARCH CLASS:
307, Electrical Transmission or Interconnection Systems, subclass 400 for electrets used in saturable reactor systems.
- 147 Persistent internal polarization (PIP):**
This subclass is indented under subclass 129. Subject matter in which storage is effected and information is represented by the persistent internal polarization by an established electric field in a photoconductive dielectric medium, i.e., photoelectret.
- SEE OR SEARCH CLASS:
355, Photocopying, subclasses 3+ for electric photography.
430, Radiation Imagery Chemistry: Process, Composition, or Product Thereof, subclasses 31+ for elements of electrical photography and radiation sensitive conductive compositions.
- 148 Resistive:**
This subclass is indented under subclass 129. Subject matter in which the storage element is an electrically resistive member.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
100, for semipermanent resistor memories.
- 112, for optically controlled resistive devices, i.e., photoconductors.
- 160, for magnetically controlled resistive devices, i.e., superconductors.
- SEE OR SEARCH CLASS:
250, Radiant Energy, subclasses 200+ for photocell devices.
338, Electrical Resistors, subclasses 13+ for resistance value responsive to a condition, subclass 32 for superconductors.
- 149 Capacitors:**
This subclass is indented under subclass 129. Subject matter in which the storage element is a capacitive device.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
102, for semipermanent capacitor memories.
- SEE OR SEARCH CLASS:
307, Electrical Transmission or Interconnection Systems, subclass 108 for pulse generators using a capacitor and subclasses 109 and 110 for other capacitor circuits storing energy.
320, Electricity: Battery or Capacitor Charging or Discharging, subclasses 166+ for capacitor charging or discharging, per se.
327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, appropriate subclasses for miscellaneous circuits utilizing a capacitive storage element.
361, Electricity: Electrical Systems and Devices, subclasses 271+ for capacitors, per se, subclasses 500+ for electrolytic capacitors, systems and devices.
- 150 Inherent:**
This subclass is indented under subclass 149. Subject matter wherein the capacitor is the inherent capacitance of a circuit element.
- 151 Molecular or atomic:**
This subclass is indented under subclass 129. Subject matter in which information is stored at a molecular, atomic, a subatomic level, or arrangement.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

119, for color centers (photochromatic material).

152 Nuclear induction or spin echo:

This subclass is indented under subclass 151. Subject matter which exploits nuclear induction spin echo capability for information storage and retrieval.

153 Electrochemical:

This subclass is indented under subclass 129. Subject matter where an electrochemical material is used for the storage and retrieval of information.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

45, for analog electrochemical storage devices.

SEE OR SEARCH CLASS:

29, Metal Working, subclass 25.03 for the manufacture of electrolytic type devices.

136, Batteries: Thermoelectric and Photoelectric, appropriate subclasses for producing electricity by electrochemical action.

204, Chemistry: Electrical and Wave Energy, appropriate subclasses for electrolytic devices utilized to produce chemical change, as for example, electroplating cells, and for analytical and control electrolytic devices, such as pH cells.

252, Compositions, subclass 62.2 for electrolytes for electrical devices, and subclass 62.3 for barrier layer device compositions.

314, Electric Lamp and Discharge Devices, Consumable Electrodes, subclass 132 for arc lamps having electrolytic resistances.

320, Electricity: Battery or Capacitor Charging or Discharging, appropriate subclass for charging or discharging an electrolytic capacitor or an electrolytic cell.

322, Electricity: Single Generator Systems, subclass 79 for the control of the generator circuit by the use of electrolytic impedances.

324, Electricity: Measuring and Testing, subclasses 425+ for electrolytic testing systems, such as pH measuring systems.

329, Demodulators, appropriate subclasses for electrolytic type demodulators.

338, Electrical Resistors, subclasses 80+ for mechanically variable liquid resistors, and subclass 222 for fixed value liquid resistors.

361, Electricity: Electrical Systems and Devices, subclasses 500+ for electrolytic systems and devices.

363, Electric Power Conversion Systems, subclass 140 for rectifying systems utilizing electrolytic rectifiers.

154 Flip-flop (electrical):

This subclass is indented under subclass 129. Subject matter in which the storage element is an electrical bistable multivibrator.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

72, for flip-flop systems having significant interconnection arrangements.

190, for read/write circuit which uses a complementary information storage cell.

204, for flip-flops used for sensing information.

SEE OR SEARCH CLASS:

307, Electrical Transmission or Interconnection Systems, subclass 406 for magnetic flip-flop devices.

327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 185+ for miscellaneous flip-flop circuits.

155 Plural emitter or collector:

This subclass is indented under subclass 154. Subject matter in which the flip-flop is made up of solid-state devices which have plural emitters or plural collectors.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

179, for a memory system using plural emitter or collector device as a semi-conductive storage element (nonflip-flop).

SEE OR SEARCH CLASS:

257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), appropriate subclasses for active solid-state devices having multiple/plural emitters or collectors, especially subclasses 164 through 166 and 560-564.

327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 577 and 578 for miscellaneous transistor circuits having multiple collectors or emitters.

156 **Complementary:**

This subclass is indented under subclass 154. Subject matter employing devices having complementary (pnp and npn) conductivity components.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

181, for a memory system using complementary conductivity semiconductive device as a storage element (nonflip-flop).

SEE OR SEARCH CLASS:

326, Electronic Digital Logic Circuitry, appropriate subclasses for logic circuits utilizing complementary FET devices.

327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 214, 484+, and 576 for miscellaneous circuits utilizing complementary transistors.

157 **Magnetostrictive or piezoelectric:**

This subclass is indented under subclass 129. Subject matter in which the storage element is magnetostrictive or piezoelectric, that is, the shrinkage or expansion of a material when placed in a magnetic or electric field, respectively.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

76+, for recirculation stores using magnetostrictive or piezoelectric delay lines.

SEE OR SEARCH CLASS:

310, Electrical Generator or Motor Structure, subclasses 311+ for piezoelectric devices.

333, Wave Transmission Lines and Networks, subclasses 138+ for delay networks which use a magnetostrictive device.

335, Electricity: Magnetically Operated Switches, Magnets, and Electromagnets, subclass 215 for magnetostrictive type devices.

158 **Magnetoresistive:**

This subclass is indented under subclass 129. Subject matter in which the storage element changes in electrical conductivity when a magnetic field is applied.

SEE OR SEARCH CLASS:

338, Electrical Resistors, subclasses 32+ for magnetoresistive devices, per se.

159 **Negative resistance:**

This subclass is indented under subclass 129. Subject matter in which the storage element exhibits negative resistance.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

71, for negative resistance interconnection arrangements.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, particularly subclasses 568+ for miscellaneous negative resistance device circuits.

160 **Superconductive:**

This subclass is indented under subclass 129. Subject matter in which the storage element is superconductive in that it has a finite electrical resistance at particular (usually normal) temperatures and magnetic field strength and zero resistance at (usually) cryogenic temperatures and low field strengths, the change of resis-

tance or presence or absence of current in the superconductor being used to signify information.

SEE OR SEARCH CLASS:

- 326, Electronic Digital Logic Circuitry, subclasses 1+ for superconductive logic circuits.
- 327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 186+ and 527+ for miscellaneous circuits utilizing superconducting elements.
- 335, Electricity: Magnetically Operated Switches, Magnets, and Electromagnets, subclass 216 for superconductive type magnetic devices.
- 338, Electrical Resistors, subclasses 32+ for superconductors, *per se*.

161 Thin film:

This subclass is indented under subclass 160. Subject matter in which the superconductor is in addition a thin film device.

162 Josephson:

This subclass is indented under subclass 160. Subject matter in which information is stored as a function of tunneling in a Josephson junction.

SEE OR SEARCH CLASS:

- 257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), subclasses 31 through 36 for Josephson devices, *per se*.

163 Amorphous (electrical):

This subclass is indented under subclass 129. Subject matter in which information is stored as a function of the electrical condition of an amorphous material.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 113, for amorphous which are effected by radiant energy.

SEE OR SEARCH CLASS:

- 257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), subclasses 2 through 5, 16, 49+, especially 52-63, 646 and 650 for amorphous material devices.

164 Electrical contacts:

This subclass is indented under subclass 129. Subject matter in which information is stored as a function of the condition (e.g., presence or absence, opened or closed) of electrical contacts.

SEE OR SEARCH CLASS:

- 74, Machine Element or Mechanism, subclass 568 for memory devices using contacts activated by cams.

165 Coherer:

This subclass is indented under subclass 164. Subject matter where storage device contacts are embedded in a cohere material which is responsive to a current or pressure by a physical change (usually from a solid coherent mass to a powder) which effects a change in the material resistance.

SEE OR SEARCH CLASS:

- 338, Electrical Resistors, appropriate subclass for coherer devices, *per se*.

166 Relay:

This subclass is indented under subclass 164. Subject matter in which the storage element is one or more relays.

SEE OR SEARCH CLASS:

- 335, Electricity: Magnetically Operated Switches, Magnets, and Electromagnets, appropriate subclass for relay devices, *per se*.
- 361, Electricity: Electrical Systems and Devices, subclasses 160+ for electric relay circuits.

167 Simulating biological cells:

This subclass is indented under subclass 129. Subject matter in which information is stored in a device which simulates the function of a living nerve cell.

SEE OR SEARCH CLASS:

- 706, Data Processing: Artificial Intelligence, subclass 44 for simulating operational functions of living nerve cells.

168 Ternary:

This subclass is indented under subclass 129. Subject matter which uses storage cells having three stable states.

169 Gunn effect:

This subclass is indented under subclass 129. Subject matter in which the storage element is an electrical shock wave responsive or generative device.

SEE OR SEARCH CLASS:

- 257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), subclasses 6 through 8 for Gunn effect oscillators.
- 327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, appropriate subclasses for miscellaneous circuitry employing Gunn effect devices.
- 331, Oscillators, subclass 107 for Gunn effect oscillators.

170 Hall effect:

This subclass is indented under subclass 129. Subject matter in which the storage element or a component of the storage element exhibits Hall effect characteristics.

SEE OR SEARCH CLASS:

- 324, Electricity: Measuring and Testing, subclass 45 for determining the characteristics of a magnetic field utilizing the Hall effect.
- 327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclass 187 for a stable state circuit with a Hall element and subclass 511 for a miscellaneous circuit utilizing a Hall element.
- 329, Demodulators, appropriate subclasses for demodulating elements whose resistance or reactance changes in response to an applied magnetic field.
- 338, Electrical Resistors, subclass 32 for Hall effect devices.

171 Magnetic thin film:

This subclass is indented under subclass 129. Subject matter where the storage element is a thin film cell which has a thickness of approximately 1 to 12,000 angstroms.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 87, for magnetic shift registers which use thin film storage elements.

SEE OR SEARCH CLASS:

- 307, Electrical Transmission or Interconnection Systems, subclass 403 for saturable reactor systems which use thin film components.
- 327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclass 567 for a miscellaneous circuit utilizing a thin film device.

172 Isotropic:

This subclass is indented under subclass 171. Subject matter in which the thin film device has a plurality of easy axes of magnetization.

173 Multiple magnetic storage layers:

This subclass is indented under subclass 171. Subject matter where information is stored in a plurality of magnetic layers within the thin film device.

- (1) Note. Included within this subclass are thin film devices containing a storage layer and a read out layer.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 130, for three-dimensional magnetic storage devices where the adjacent layers are separate.

174 Semiconductive:

This subclass is indented under subclass 129. Subject matter in which information is stored and retrieved from a semiconductive material.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 72, for transistor or diode interconnection arrangement.

SEE OR SEARCH CLASS:

- 257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), appropriate subclasses for active semiconductive material devices, per se.
- 327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, appropriate subclasses for miscellaneous nonlinear circuits utilizing semiconducting devices.
- 438, Semiconductor Device Manufacturing: Process, for methods of making semiconductor memory devices; see the search notes therein.

175 Diodes:

This subclass is indented under subclass 174. Subject matter in which the semiconductor storage element is a diode.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 72, for transistor or diode interconnection arrangements.
- 105, for read only memory systems which use semiconductive diodes.
- 115, for radiant energy memory systems which use semiconductive diodes.
- 243, for current steering diodes in an addressing storage system.

176 Silicon on sapphire (SoS):

This subclass is indented under subclass 174. Subject matter in which the storage element is silicon on sapphire material.

177 Bipolar and FET:

This subclass is indented under subclass 174. Subject matter in which bipolar and field effect transistors are used together in a storage system.

SEE OR SEARCH CLASS:

- 257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), subclasses 273, 370 and 378 for combined bipolar and field effect devices.

178 Ion implantation:

This subclass is indented under subclass 174. Subject matter in which the semiconductive storage member is subjected to modification by ion implantation.

SEE OR SEARCH CLASS:

- 438, Semiconductor Device Manufacturing: Process, for methods of making semiconductor memory devices; see the search notes therein.

179 Plural emitter or collector:

This subclass is indented under subclass 174. Subject matter in which the semiconductive storage element is either a plural emitter or a plural collector device.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 155, for flip-flop storage devices which use plural emitter or collector semiconductive materials.

SEE OR SEARCH CLASS:

- 257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), appropriate subclasses for active solid-state devices having multiple/plural emitters or collectors, especially subclasses 164 through 166 and 560 through 564.

180 Four layer devices:

This subclass is indented under subclass 174. Subject matter in which four layer devices are used (e.g., pnpn transistors).

SEE OR SEARCH CLASS:

- 257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), subclasses 107 through 181 for regenerative type devices.
- 326, Electronic Digital Logic Circuitry, appropriate subclasses for electronic logic circuits utilizing four or more layer devices.
- 327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, appropriate subclasses for miscellaneous circuits utilizing four or more layer devices.

181 Complementary conductivity:

This subclass is indented under subclass 174. Subject matter in which the storage elements are of complementary conductivity (e.g., pnp plus npn).

SEE OR SEARCH THIS CLASS, SUBCLASS:

156, for flip-flop storage devices which use complementary elements.

SEE OR SEARCH CLASS:

257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), appropriate subclasses, including regenerative type devices in subclasses 107 through 181, bipolar devices in subclasses 565+, and field effect devices in subclasses 213+.

326, Electronic Digital Logic Circuitry, appropriate subclasses for logic circuits which utilize complementary transistors.

327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, particularly subclass 576 for miscellaneous circuits utilizing complementary transistors.

182 Insulated gate devices:

This subclass is indented under subclass 174. Subject matter in which the storage element is an insulated gate device (e.g., FET).

SEE OR SEARCH CLASS:

257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), appropriate subclasses, including subclasses 288 through 413 for devices with an insulated electrode, including insulated gate electrode.

326, Electronic Digital Logic Circuitry, appropriate subclasses for logic circuits utilizing field-effect transistors.

327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, appropriate subclasses for miscellaneous circuits utilizing field-effect transistors.

183 Charge coupled:

This subclass is indented under subclass 182. Subject matter in which the storage element is a charge coupled device.

SEE OR SEARCH CLASS:

257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), appropriate subclasses, including subclasses 215+, for charge transfer type active semiconductor devices, per se.

377, Electrical Pulse Counters, Pulse Dividers, or Shift Registers: Circuits and Systems, subclass 63 for charge-coupled devices used as pulse counters and shift registers.

184 Variable threshold:

This subclass is indented under subclass 182. Subject matter in which the storage device is a FET transistor which has a variable threshold gate, e.g., MNOS.

185.01 FLOATING GATE:

This subclass is indented under the class definition. Subject matter wherein a device stores and retrieves information from a conductive insulated gate that indefinitely holds an amount of charge having a specific polarity, and it is electrically insulated and isolated from other parts of the device.

(1) Note. A floating gate array usually has, at least, a second control gate that may be connected to the word (row address) line for the inducement of an operative control potential during operation.

SEE OR SEARCH CLASS:

257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), subclass 314 for a substructure floating gate memory device having a variable threshold (e.g., by storage of charge in an insulator layer adjacent to a channel).

185.02 Disturbance control:

Subject matter under 185.01 wherein a threshold shifting effect is minimized from erasing, reading, and/or programming of a specific memory cell on any adjacent memory cells in the floating gate array.

185.03 Multiple values (e.g., analog):

Subject matter under 185.01 wherein the floating gate device is adapted to store and operate on multiple-valued electrical data signals.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

45, for analog data signals, per se.
168, for nonfloating gate device adapted to store and operate on multiple-valued electrical data signals.

185.04 Data security:

Subject matter under 185.01 wherein the floating gate device has an ability to secure or permanently preserve electric data signals from being erased (e.g., by tampering or overwriting) from memory cells.

- (1) Note. For example, this subject matter may include either an integral light shield to prevent memory cells from being erased or circuit fuses which may secure the data.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

185.32, for radiation erasure details.

SEE OR SEARCH CLASS:

380, Cryptography, subclass 4 for digital data protection, per se.
705, Data Processing: Financial, Business Practice, Management, or Cost/Price Determination, subclasses 51 through 54 for usage protection of a distributed data file.
726, Information Security, subclasses 1 through 30 for information security in computers or digital processing system.

185.05 Particular connection:

Subject matter under 185.01 wherein the floating gate device is enabled to form a connection or perform a switchable function.

- (1) Note. For example, this subject matter may include a particular decoder.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

64, for an innerconnection arrangement, per se.
189.08, for an array capable of performing specified logic functions.

SEE OR SEARCH CLASS:

326, Electronic Digital Logic Circuitry, subclasses 37+ for multifunction or programmable connection.
340, Communications: Electrical, subclasses 14.3 through 14.31 for programmable decoder matrix connection.

185.06 Segregated columns:

Subject matter under 185.05 wherein the connection within the floating gate device has separate source and drain lines for each column of memory cells, thereby each column's source and drain lines are separate from and not shared with any other column's source and drain lines.

185.07 Cross-coupled cell:

Subject matter under 185.05 wherein one or more floating gate elements are directly wired in a cross-coupled circuit.

- (1) Note. The floating gate element may function, for example, as a switch or a load element.
(2) Note. Floating gate arrays that interact with and are connected through data/bit lines to a separate cross-coupled volatile static ram cell are not classified herein; for this subject matter see SEARCH THIS CLASS, SUBCLASS below.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

185.08, for floating gate elements that interact with and are connected through data/bit lines to a separate cross-coupled volatile static ram cell.

185.08 With volatile signal storage device:

Subject matter under 185.05 wherein the floating gate device is directly connected to exchange a signal between a separate volatile signal storage device and itself.

- (1) Note. For example, this subject matter may include a separate volatile capacitor, a separate volatile SRAM cell, etc.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 154, for storage elements that are electrical bistable multivibrators (i.e., flip-flops).
156, for employing devices having complementary (pnp and npn) conductivity components.
228, for data preservation.

185.09 Error correction (e.g., redundancy, endurance):

Subject matter under 185.05 wherein the floating gate device has a provision for the substitution of dysfunctional ("bad") cells, either initially or from "wear-out" of an element or array, or for prevention of the generation of bad cells.

- (1) Note. This subject matter includes means for increasing the "endurance" of an array.

SEE OR SEARCH CLASS:

- 714, Error Detection/Correction and Fault Detection/Recovery, appropriate subclasses.

185.1 Extended floating gate:

Subject matter under 185.05 wherein two or more spatially separated floating gate elements are connected by a common, extended floating gate.

- (1) Note. For example, programming means in the substrate that are spatially separated from the main floating gate transistor or a CMOS transistor pair share the same floating gate.

185.11 Bank or block architecture:

Subject matter under 185.05 wherein a floating gate array is divided into independently accessible groups of memory cells.

- (1) Note. Banks of memory cells (e.g., blocks) may be separated through physical layout, particular decoding means, particular wiring means, etc.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 230.03, for addressing plural banks or blocks, per se.

185.12 Parallel row lines (e.g., page mode):

Subject matter under 185.11 wherein one of the source or drain lines in a floating gate array is parallel with the word (control gate) line of a particular row so as to form a row of accessible architecture.

- (1) Note. A row of accessible architecture may be separately accessed from the other rows.

185.13 Global word or bit lines:

Subject matter under 185.11 wherein a word (control gate) line or a data bit (drain) line in a floating gate array extends through a plurality of banks or blocks to form a common connection or connections for at least a plurality of the banks or blocks of the entire floating gate array.

- (1) Note. This subject matter includes memories where the floating gate array is the entire intact semiconductor wafer and such lines that extend across the entire wafer.

185.14 Program gate:

Subject matter under 185.05 wherein an additional insulated gate separate from the control gate provides programming or erase functions.

185.15 Weak inversion injection:

Subject matter under 185.14 wherein use of an auxiliary biased or floating gate to the source side of the main floating gate induces a weak channel thereunder so as to create a hot electron injection path in the channel for programming the main floating gate.

- (1) Note. This subject matter does not include an electrode near the source which merely produces a standard channel inversion.

185.16 Virtual ground:

Subject matter under 185.05 wherein all of the memory cells in a column are connected in parallel by column lines, and alternative column

lines are either connected to ground or switchable to a potential related to ground.

- (1) Note. All of the internal columns of the memory cells in the floating gate array share a common column line with an adjacent column. Each internal column line is shared by two columns of cells to reduce the number and size of the connections.

185.17 Logic connection (e.g., NAND string):

Subject matter under 185.05 wherein the floating gate elements are connected in a manner so as to form a logical relationship.

- (1) Note. For example, this subject matter includes a particular logic (inclusion or exclusion between two electrical signals) connection such as, but not limited to, a series connection of a plurality of floating gate arrays to form a (N)AND logic or a connection to form a (N)OR logic function. This subject matter specifically includes the "NAND string" memory architecture.

SEE OR SEARCH CLASS:

- 326, Electronic Digital Logic Circuitry, subclasses 104+ for digital logic circuitry, per se.

185.18 Particular biasing:

Subject matter under 185.01 wherein an operating environment provides electrical settings to the floating gate device.

- (1) Note. For example, particular biasing operations may include erasing, programming, testing, and/or reading.

185.19 Multiple pulses (e.g., ramp):

Subject matter under 185.18 wherein the floating gate has a particular biasing that comprises a series of pulses or a pulse that varies at a constant rate.

- (1) Note. The biasing is to enable a particular function (e.g., programming, erasure, testing, verification, etc.)

185.2 Reference signal (e.g., dummy cell):

Subject matter under 185.18 wherein a data signal on the floating gate is compared to a

threshold level or a fixed signal that acts as a constant for comparison to the data signal.

- (1) Note. This subject matter includes reference voltage generation means for reading, programming, erasing, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 210, for noise suppression by differential sensing using a reference or dummy elements.

185.21 Sensing circuitry (e.g., current mirror):

Subject matter under 185.2 wherein a detailed circuit arrangement compares a data signal to the reference signal and delivers a resulting output signal.

SEE OR SEARCH CLASS:

- 327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 51+ for particular structure of sensing amplifiers, per se.

185.22 Verify signal:

Subject matter under 185.2 including the use of any circuitry, procedure, or other means to verify that the data signal has been properly written or erased from a memory cell.

185.23 Drive circuitry (e.g., word line driver):

Subject matter under 185.18 including logic, power, and switching circuitry necessary to drive a word line or bit line of the floating gate device into any of its operational modes.

185.24 Threshold setting (e.g., conditioning):

Subject matter under 185.18 wherein a particular process or means is used in a floating gate device to set the threshold to a predetermined value during either programming or erasure.

SEE OR SEARCH CLASS:

- 257, Active Solid-State Devices (e.g., Transistors, Solid-State Diodes), subclass 314 for substructure floating gate memory device having a variable threshold (e.g., by storage of charge in an insulator layer adjacent a channel).

185.25 Line charging (e.g., precharge, discharge, refresh):

Subject matter under 185.18 wherein the floating gate device circuitry there is either a precharge, refresh, or a discharge of the bit lines.

185.26 Floating electrode (e.g., source, control gate, drain):

Subject matter under 185.18 wherein one or more of the source, control gate, drain, or substrate of a floating gate device is left floating rather than being tied to a potential.

185.27 Substrate bias:

Subject matter under 185.18 wherein the floating gate device has a particular and significant biasing applied to the substrate or isolated semiconductor well region.

- (1) Note. This subject matter includes external potential connections and may include internal charge pumps.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclass 534 for particular substrate biasing arrangements.

185.28 Tunnel programming:

Subject matter under 185.18 wherein the floating gate device is programmed through a thin insulated region that provides a charge tunnel to the floating gate.

- (1) Note. For specific hot carrier injection mechanism subject matter, see SEARCH THIS CLASS, SUBCLASS below.

SEE OR SEARCH THIS CLASS, SUBCLASS:

185.15, for hot carrier injections by a weak inversion channel.

185.29 Erase:

Subject matter under 185.18 wherein an arrangement or process is provided for reducing the net charge on memory cells on the floating gate.

- (1) Note. The convention of "removal of charges" (either positive or negative) from the floating gate to reduce the net

charge thereon will be considered "erasure." "Erasure" need not be on a complete block or bank to be considered under this subject matter.

185.3 Over erasure:

Subject matter under 185.29 including the use of any circuitry or means to measure or prevent over erasure of memory cells (i.e., removal of more charge than is desired for a particular logic level setting).

185.31 Nonsubstrate discharge:

Subject matter under 185.29 wherein the floating gate is erased by overlying electrodes or other means not directly connected to the substrate, and the charge carriers are not directly removed to the substrate.

185.32 Radiation erasure:

Subject matter under 185.31 wherein electromagnetic wave energy is used to erase an electric charge on the floating gate.

- (1) Note. Electromagnetic wave energy includes X-ray, gamma ray, ultra violet, etc.

185.33 Flash:

Subject matter under 185.29 wherein the floating gate is electrically erasable by block or bulk.

- (1) Note. For Electrically Erasable Programmable Read Only Memory (EEPROM) to be considered flash memory, it must be erasable in blocks (e.g., erased as a whole or in a row or in banks).

186 Single device per bit:

This subclass is indented under subclass 174. Subject matter in which the storage element for one bit of information is composed of a single semiconductive device.

187 Three devices per bit:

This subclass is indented under subclass 174. Subject matter in which the storage element for one bit of information is composed of three semiconductive devices.

188 Four or more devices per bit:

This subclass is indented under subclass 174. Subject matter in which the storage element for one bit of information is composed of four or more semiconductive devices.

189.01 READ/WRITE CIRCUIT:

This subclass is indented under the class definition. Subject matter for inserting, extracting, or handling of an information signal to be stored or retrieved.

- (1) Note In this and its indented subclasses the term "processing" as applied to signals is specifically intended to excludedigital data processing systems and computer systems

SEE OR SEARCH THIS CLASS, SUB-CLASS:

- 51, for the physical arrangement of memory components.
52+, for storage element hardware.
63+, for interconnection arrangement for information transfer.
230.01+, for selection of memory locations.

SEE OR SEARCH CLASS:

- 327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 51+ for miscellaneous amplitude discriminating circuits having a sense amplifier.
340, Communications: Electrical, subclasses 2.2 through 2.31 for a channel selecting matrix and subclasses 14.1-14.69 for a decoder matrix.
370, Multiplex Communications, appropriate subclasses for multiplex switching techniques similar to addressing or the handling of memory information signals.
711, Electrical Computers and Digital Processing Systems: Memory, subclasses 1+ for addressing combined with specific memory configurations (e.g., extended, expanded, dynamic, etc.) in a digital data processing system, subclasses 100+ for generalized address forming in a digital data processing system, and subclasses 200+ for generalized storage accessing and

control in a digital data processing system.

189.02 Multiplexing:

This subclass is indented under subclass 189.01. Subject matter which includes the transmission of plural signals over a single signal path.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

230.02, for multiplexing of static memory address signals.

SEE OR SEARCH CLASS:

370, Multiplex Communications, subclasses 351+ for pathfinding or routing in multiplex communications which may include a static memory read and write circuit.

189.03 Plural use of terminal:

This subclass is indented under subclass 189.01. Subject matter which has a terminal connecting the memory to a data handling circuit and another diverse circuit.

- (1) Note. Such a diverse circuit may be an addressing, power or testing circuit.
(2) Note. Circuits having different signal levels for different functions are also found in this subclass.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

189.02, for multiplexing of data signals in a read/write memory circuit.
230.02, for multiplexing of address signals in a memory addressing circuit.

189.04 Simultaneous operations (e.g., read/write):

This subclass is indented under subclass 189.01. Subject matter including circuitry for performing multiple operations (e.g., storing information in and retrieving information from the memory) at the same time.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

230.05, for an addressing circuit having plural address ports for independent access.

SEE OR SEARCH CLASS:

370, Multiplex Communications, subclasses 276+ for duplex communications not limited to a static memory read and write circuit.

189.05 Having particular data buffer or latch:

This subclass is indented under subclass 189.01. Subject matter including a specific detail of a temporary storage circuit for a data signal.

SEE OR SEARCH THIS CLASS, SUBCLASS:

205+, for a specific sense amplifier circuit in a memory system.
230.08, for a feature of an address buffer or latch.

189.06 Including signal clamping:

This subclass is indented under subclass 189.01. Subject matter including circuitry for limiting the variation of a signal (e.g., voltage) in order to keep such variation at a predetermined level.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 309+ for miscellaneous clamping circuits.

189.07 Including signal comparison:

This subclass is indented under subclass 189.01. Subject matter including circuitry to compare plural signal in order to control an operation of the system on a data signal.

SEE OR SEARCH THIS CLASS, SUBCLASS:

49, for a comparator in a content addressable memory.
205, and 206+, for comparison between stored data and a reference voltage or value.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 1+ for miscellaneous signal comparing circuits.

189.08 Including specified plural element logic arrangement:

This subclass is indented under subclass 189.01. Subject matter describing the configuration of multiple logic devices which handle the information signal.

SEE OR SEARCH CLASS:

326, Electronic Digital Logic Circuitry, appropriate subclasses for electronic digital logic circuitry.

189.09 Including reference or bias voltage generator:

This subclass is indented under subclass 189.01. Subject matter including a particular voltage or bias source.

SEE OR SEARCH THIS CLASS, SUBCLASS:

210, for an element used to generate reference voltage for a sense amplifier.

SEE OR SEARCH CLASS:

323, Electricity: Power Supply or Regulation Systems, subclasses 311+ for a self-regulating reference or bias circuit.
327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 530+ for miscellaneous circuits having significant bias circuitry.

189.11 Including level shift or pull-up circuit:

This subclass is indented under subclass 189.01. Subject matter including a circuit element which makes an adjustment in the voltage level of an information signal to enhance driving capability.

SEE OR SEARCH CLASS:

326, Electronic Digital Logic Circuitry, subclasses 88 and 92 for logic circuits with bootstrapping.
327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 390 and 589 for miscellaneous circuits utilizing bootstrapping.

189.12 With shift register:

This subclass is indented under subclass 189.01. Subject matter including a circuit which sequentially shifts the data information signal between one element and another in a memory array in a serial manner.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

78, for a plural shift register memory device.
219, and 221, for a serial memory device.
238, for memory addressing circuitry including a shift register.

SEE OR SEARCH CLASS:

377, Electrical Pulse Counters, Pulse Dividers, or Shift Registers: Circuits and Systems, subclasses 57 and 64 for structure or circuitry of a shift register, not limited to a static memory system.

190 For complementary information:

This subclass is indented under subclass 189.01. Subject matter wherein the read/write circuit is used with a memory cell containing complementary information.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

204, for flip-flops used for sensing in a read/write circuit.
207, for differential sensing.

SEE OR SEARCH CLASS:

327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 545+ for miscellaneous bias circuits with signal protection or bias preservation.

191 Signals:

This subclass is indented under subclass 189.01. Subject matter where particular signals are used for writing, maintaining, or reading information.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

230.01+, for addressing a particular memory.

192 Radio frequency:

This subclass is indented under subclass 191. Subject matter where the particular signal is a radio frequency signal.

193 Strobe:

This subclass is indented under subclass 191. Subject matter where the particular signal is used for strobing the memory device.

194 Delay:

This subclass is indented under subclass 191. Subject matter where the particular signal is delayed during writing or reading.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

76, for recirculation stores used as delay lines.
93, for magnetic shift registers including delay means.

195 Inhibit:

This subclass is indented under subclass 191. Subject matter where an inhibit operation is used to prevent the writing or reading of information.

196 Sense/inhibit:

This subclass is indented under subclass 195. Subject matter where the same conductor is used for both an inhibit operation and a sensing operation during different time periods.

197 Microwave:

This subclass is indented under subclass 191. Subject matter where the particular signal is in the microwave range.

198 Transmission:

This subclass is indented under subclass 191. Subject matter where transmission line signals and principles are used for writing or reading information.

SEE OR SEARCH CLASS:

333, Wave Transmission Lines and Networks, for nonstorage of information, note subclass 12.

199 Coincident A.C. signal with pulse:

This subclass is indented under subclass 191. Subject matter where the particular signal is the combination of an A.C. signal and pulse signal.

200 Bad bit:

This subclass is indented under subclass 189.01. Subject matter in which erroneous, defective, or partially defective storage locations are used to store information.

SEE OR SEARCH CLASS:

714, Error Detection/Correction and Fault Detection/Recovery, subclasses 5+ for memory or peripheral subsystem affected recovery, subclass 42 for memory or storage device component fault, and subclass 54 for storage content error reliability testing in digital data processing systems, subclass 710 and 711 for fault recovery of a memory system; subclasses 718+ for diagnostic testing of a memory system, and subclasses 763+ for digital data error correction during memory access.

201 Testing:

This subclass is indented under subclass 189.01. Subject matter including the specifics of the memory which are tested for defects or erroneous information.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

200, where defective memory devices are used to store information.

SEE OR SEARCH CLASS:

324, Electricity: Measuring and Testing, subclass 34 for testing of magnetic properties.
714, Error Detection/Correction and Fault Detection/Recovery, subclasses 5+ for memory or peripheral subsystem affected recovery, subclass 42 for memory or storage device component fault, and subclass 54 for storage content error reliability testing in digital data processing systems, and subclasses 718+ for diagnostic testing of a memory system.

202 Complementing/balancing:

This subclass is indented under subclass 189.01. Subject matter in which complementing or balancing signals are used in a read/write circuit, e.g., a storage system having an auxiliary storage circuit for complementary signals to be used for noise cancellation.

SEE OR SEARCH CLASS:

333, Wave Transmission Lines and Networks, subclass 4 for plural channel systems with balanced circuits, subclass 25 for coupling networks with balanced circuits.

203 Precharge:

This subclass is indented under subclass 189.01. Subject matter wherein circuit lines or elements are charged (or discharged) to a desired level just prior to reading or writing information.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

149, and 150, for information stored in the form of a charge.

SEE OR SEARCH CLASS:

307, Electrical Transmission or Interconnection Systems, subclass 109 for miscellaneous transmission or interconnection capacitor circuits.
320, Electricity: Battery or Capacitor Charging or Discharging, subclasses 166+ for capacitor charging or discharging, per se.

204 Accelerating charge or discharge:

This subclass is indented under subclass 189.01. Subject matter wherein a circuit senses a charging (or discharging) operation and switches in a parallel path to decrease the charging (or discharging) time.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

149, and 150, for charging and discharging information stores.
203, for precharging circuit lines or elements.

- SEE OR SEARCH CLASS:
 307, Electrical Transmission or Interconnection Systems, subclass 109 for miscellaneous transmission or interconnection capacitor circuits.
 320, Electricity: Battery or Capacitor Charging or Discharging, subclasses 166+ for capacitor charging or discharging, per se.
- 205 Flip-flop used for sensing:**
 This subclass is indented under subclass 189.01. Subject matter wherein the sensing circuit is a flip-flop circuit.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
 154, for flip-flop used as storage elements in a memory system.
 190, for read/write circuits used in a memory system that contains flip-flop storage elements.
 207, for differential sensing.
- SEE OR SEARCH CLASS:
 327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 185+ and particularly subclasses 199+ for miscellaneous flip-flop circuits.
- 206 Noise suppression:**
 This subclass is indented under subclass 189.01. Subject matter having circuits for the cancellation or reduction of noise or spurious signals.
- 207 Differential sensing:**
 This subclass is indented under subclass 206. Subject matter where the circuit used is of the differential sensing type.
- 208 Semiconductors:**
 This subclass is indented under subclass 207. Subject matter where the differential sensing is performed upon a semiconductor memory element.
- 209 Magnetic:**
 This subclass is indented under subclass 207. Subject matter where the differential sensing is performed upon a magnetic memory element.
- 210 Reference or dummy element:**
 This subclass is indented under subclass 209. Subject matter where the magnetic differential sensing circuit uses an additional magnetic element.
- 211 Temperature compensation:**
 This subclass is indented under subclass 206. Subject matter where the circuit used is for compensating temperature changes.
- 212 Semiconductor:**
 This subclass is indented under subclass 211. Subject matter where the temperature compensation is performed upon a semiconductor memory element.
- 213 Magnetic:**
 This subclass is indented under subclass 211. Subject matter where the temperature compensation is performed upon a magnetic memory element.
- 214 Particular wiring:**
 This subclass is indented under subclass 206. Subject matter where the circuit includes wiring the elements in a particular arrangement to obtain noise cancellation.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
 63, which may or may not include noise cancellation.
- 215 Optical:**
 This subclass is indented under subclass 189.01. Subject matter in which the read/write circuit is for an optical storage system.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
 106+, for radiant energy information storage.
 120+, for information masking in an optical storage system.
- 216 Holographic:**
 This subclass is indented under subclass 215. Subject matter wherein the circuit is used to read/write holographic memories.

- SEE OR SEARCH THIS CLASS, SUB-CLASS:
125, for information masking which uses holograms.
- SEE OR SEARCH CLASS:
235, Registers, subclass 457 for holographic card readers.
359, Optics: Systems and Elements, sub-classes 1+ for storage systems where there is a holographic storage medium storing information signal absent any electrical circuitry.
- 217 Electron beam:**
This subclass is indented under subclass 189.01. Subject matter in which the read/write circuit is for an electron beam storage system.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
237, for addressing a memory with an electron beam.
- 218 Erase:**
This subclass is indented under subclass 189.01. Subject matter in which the read/write circuit is or includes an erase circuit for a storage system.
- 219 SiPo/PiSo:**
This subclass is indented under subclass 189.01. Subject matter in which the read/write circuit for memory provides Serial Input with Parallel Output or Parallel Input with Serial Output.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
238, for Cartesian memories in which all of the above concepts may be present.
- SEE OR SEARCH CLASS:
340, Communications: Electrical, sub-classes 14.1 through 14.69 for logic and switching circuits having a decoder matrix form with various input/output capability.
- 220 Parallel read/write:**
This subclass is indented under subclass 189.01. Subject matter wherein information is written into a memory in parallel form and read out in parallel form.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
235, for addressing optical memory locations simultaneously.
- 221 Serial read/write:**
This subclass is indented under subclass 189.01. Subject matter wherein information is written into a memory in serial form and read out in serial form.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
73+, for recirculation memories which are usually read and written in this manner.
- 222 Data refresh:**
This subclass is indented under subclass 189.01. Subject matter wherein decaying information is read before it becomes unrecognizable, and rewritten in original form, e.g., charge on a capacitor is read before too much has leaked off, then rewritten to a fully charged state.
- SEE OR SEARCH THIS CLASS, SUB-CLASS:
149, for capacitor stores which require refresh.
183, for charge coupled stores which require refresh.
- 223 Bridge:**
This subclass is indented under subclass 189.01. Subject matter where the sensing circuit is in the form of a bridge circuit.
- SEE OR SEARCH CLASS:
323, Electricity: Power Supply or Regulation Systems, subclass 365 for bridge arrangement used in electric storage discharge device.
324, Electricity: Measuring and Testing, subclass 98 for balancing bridge electricity.

- 333, Wave Transmission Lines and Networks, appropriate subclass for bridge type networks.
- 224 Eddy current:**
This subclass is indented under subclass 189.01. Subject matter having circuits containing Eddy currents.
- SEE OR SEARCH CLASS:
324, Electricity: Measuring and Testing, subclass 40 for measuring Eddy currents.
- 225 Minor loop:**
This subclass is indented under subclass 189.01. Subject matter where the read/write circuit results in the operation of a magnetic memory element or any hysteresis loop other than the major loop.
- (1) Note. Excluded are circuits which contain a multiaperture magnetic memory element.
- 225.5 Including magnetic element:**
This subclass is indented under subclass 189.01. Subject matter in which the read/write circuit includes a magnetic element.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
230.07, for an address decoder circuit having a magnetic element.
243.5, for a memory address selection circuit having a magnetic element.
- SEE OR SEARCH CLASS:
307, Electrical Transmission or Interconnection Systems, subclasses 401+ for a nonlinear reactor system.
327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 190+ for a stable state circuit with transformer or saturable core device.
336, Inductor Devices, appropriate subclasses for structure of a magnetic circuit element.
- 225.6 Having bipolar circuit element:**
This subclass is indented under subclass 189.01. Subject matter including a semiconductor element having plural potential barriers (i.e., junctions).
- (1) Note. Circuits with only named bipolar devices are included in this subclass.
- SEE OR SEARCH CLASS:
326, Electronic Digital Logic Circuitry, appropriate subclasses for logic circuits utilizing bipolar devices.
327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 574+ for miscellaneous circuits utilizing bipolar transistors.
- 225.7 Having fuse element:**
This subclass is indented under subclass 189.01. Subject matter wherein the circuit includes a circuit element which is selectively melted or disintegrated to make or break an electric circuit to control the operating characteristics of a memory read or write circuit.
- SEE OR SEARCH THIS CLASS, SUBCLASS:
96, for a memory system including data storage by a fusible memory element.
200, for a memory system including a redundant or spare element and having a fuse circuit which selectively activates or deactivates certain circuit elements.
- SEE OR SEARCH CLASS:
326, Electronic Digital Logic Circuitry, subclasses 37+ for a programmable logic circuit.
327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclass 525 for a miscellaneous circuit with a fusible link.
340, Communications: Electrical, subclass 14.31 for a decoder matrix having programmable fusible elements.
438, Semiconductor Device Manufacturing: Process, particularly subclasses 467, 600, and 601 for methods of altering the conductivity of a fuse or antifuse element associated with a semiconductor integrated circuit.

226 POWERING:

This subclass is indented under the class definition. Subject matter having powering concepts relating to memories.

- (1) Note. This class excludes power supplies, per se, which may be used for a memory system. See Classes 307, 327, 330, and 363 for power supplies.

227 Conservation of power:

This subclass is indented under subclass 226. Subject matter having means for reduction of operational power during the memory standby phase.

228 Data preservation:

This subclass is indented under subclass 226. Subject matter which includes concepts relevant to prevention of loss of data in a storage device, e.g., prevention of data loss by provision of backup storage means.

SEE OR SEARCH CLASS:

- 714, Error Detection/Correction and Fault Detection/Recovery, subclasses 710+ for fault recovery of a memory system and subclasses 718+ for diagnostic testing of a memory system.

229 Standby power:

This subclass is indented under subclass 228. Subject matter in which data loss is prevented by using a secondary (standby) power supply during housepower interruptions.

230.01 ADDRESSING:

This subclass is indented under the class definition. Subject matter including selection of a memory location.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 189.01+, for the reading or writing of information in a memory system.

SEE OR SEARCH CLASS:

- 326, Electronic Digital Logic Circuitry, subclasses 105+ for digital logic decoding circuits, in general, and subclasses 62+ for buffer arrangements which convert logic signals between diverse logic devices broadly

described as addressing electrical memory stores, but not including specific circuitry to store information in, or retrieve information from, a memory.

- 340, Communications: Electrical, subclasses 2.2 through 2.31 for a channel selecting matrix and subclasses 14.1-14.69 for a decoder matrix.

- 370, Multiplex Communications, appropriate subclasses for multiplex switching techniques similar to addressing or the handling of memory information signals.

- 711, Electrical Computers and Digital Processing Systems: Memory, subclasses 1+ for addressing combined with specific memory configurations (e.g., extended, expanded, dynamic, etc.) in a digital data processing system, subclasses 100+ for generalized address forming in a digital data processing system, and subclasses 200+ for generalized storage accessing and control in a digital data processing system.

230.02 Multiplexing:

This subclass is indented under subclass 230.01. Subject matter which includes the transmission of plural signals over a single signal path.

SEE OR SEARCH THIS CLASS, SUBCLASS:

- 189.02, in which the data signal rather than the address signal is multiplexed.

SEE OR SEARCH CLASS:

- 370, Multiplex Communications, subclasses 351+ for pathfinding or routing in multiplex communications not limited to a static memory addressing circuit.

230.03 Plural blocks or banks:

This subclass is indented under subclass 230.01. Subject matter in which the memory elements are arranged in plural separate and distinct groups and in which at least one element from one of the groups is selectively accessed.

SEE OR SEARCH CLASS:

711, Electrical Computers and Digital Processing Systems: Memory, subclass 2 for extended/expanded memory addressing, subclass 5 for multiple memory module static memory addressing in a digital data processing system, subclasses 101+ for storage accessing and control combined with specific memory configurations (e.g., ROM, RAM, core, CAM, DASD, bubble, dynamic, etc.) in a digital data processing system, subclasses 117+ for generalized storage accessing and control of hierarchical memory arrangements in a digital data processing system, subclasses 147+ for shared memory storage accessing and control in a digital data processing system, and subclasses 200+ for generalized address forming in a digital data processing system.

230.04 Alternate addressing (e.g., even/odd):

This subclass is indented under subclass 230.03. Subject matter which successively addresses memory elements in different blocks or banks.

230.05 Multiple port access:

This subclass is indented under subclass 230.01. Subject matter having plural address circuits for independent memory access.

SEE OR SEARCH THIS CLASS, SUBCLASS:

189.04, for memory circuits in which two or more operations (e.g., read and write) are performed simultaneously.

230.06 Particular decoder or driver circuit:

This subclass is indented under subclass 230.01. Subject matter including a detail of a circuit which either changes a binary combination of memory address signals to form a selection or actuation signal, or which increases the magnitude of such an actuation signal.

- (1) Note. Mere naming of a decoder or driver circuit is not, of itself, basis for classification in this subclass.

SEE OR SEARCH CLASS:

326, Electronic Digital Logic Circuitry, subclasses 105+ for this subject matter not limited to a memory system.

230.07 Including magnetic element:

This subclass is indented under subclass 230.06. Subject matter in which a memory decoder or driver circuit includes a magnetic element.

SEE OR SEARCH THIS CLASS, SUBCLASS:

225.5, for a read/write circuit having a magnetic element.

243.5, for a memory address selection circuit having a magnetic element.

SEE OR SEARCH CLASS:

307, Electrical Transmission or Interconnection Systems, subclasses 401+ for a nonlinear reactor system.

327, Miscellaneous Active Electrical Nonlinear Devices, Circuits, and Systems, subclasses 190+ for a stable state circuit utilizing a transformer or saturable core device.

336, Inductor Devices, appropriate subclasses for structure of a magnetic circuit element.

230.08 Including particular address buffer or latch circuit arrangement:

This subclass is indented under subclass 230.01. Subject matter including a detail of a temporary storage device for an address and selection signal.

SEE OR SEARCH THIS CLASS, SUBCLASS:

189.05, for a feature of a data buffer or latch, which may be combined with an address buffer or latch.

230.09 Combined random and sequential addressing:

This subclass is indented under subclass 230.01. Subject matter including switching to permit the access to the storage elements either selectively or successively.

231 Using selective matrix:

This subclass is indented under subclass 230.01. Subject matter where at least a single matrix is used to select a memory location.

SEE OR SEARCH CLASS:

340, Communications: Electrical, subclasses 2.2 through 2.31 for a channel selecting matrix and subclasses 14.1-14.69 for a decoder matrix.

232 Magnetic:

This subclass is indented under subclass 231. Subject matter where the elements of the selective matrix are magnetic.

233 Sync/clocking:

This subclass is indented under subclass 230.01. Subject matter where synchronizing and clocking circuits are used to select a memory location.

233.5 Transition detection:

This subclass is indented under subclass 233. Subject matter which generates a clock or timing signal responsive to a change in an input signal.

234 Optical:

This subclass is indented under subclass 230.01. Subject matter having circuits for deflecting an optical beam to a particular memory location.

SEE OR SEARCH THIS CLASS, SUBCLASS:

215, for read/write circuits using optics.

235 Page memories:

This subclass is indented under subclass 234. Subject matter wherein memory locations in a plane are addressed simultaneously.

SEE OR SEARCH THIS CLASS, SUBCLASS:

106+, for particular radiant energy memories.

120+, for optical memories involving informational masking.

215, for optical reading and writing.

SEE OR SEARCH CLASS:

359, Optics: Systems (Including Communication) and Elements, for appropriate systems and elements, in particular subclasses 1+ for holographic storage.

236 Counting:

This subclass is indented under subclass 230.01. Subject matter wherein a memory location is addressed by counting locations to determine when the selected one is reached, e.g., counting matrix rows to address the desired row.

SEE OR SEARCH THIS CLASS, SUBCLASS:

238, where all rows (columns) of a memory plane are addressed simultaneously.

239, for selection of locations sequentially.

SEE OR SEARCH CLASS:

377, Electrical Pulse Counters, Pulse Dividers, or Shift Registers: Circuits and Systems, for solid-state counter circuits.

237 Electron beam:

This subclass is indented under subclass 230.01. Subject matter for addressing a memory device with an electron beam.

SEE OR SEARCH THIS CLASS, SUBCLASS:

217, for read/write circuits in an electron beam storage system.

SEE OR SEARCH CLASS:

315, Electric Lamp and Discharge Devices: Systems, subclasses 8.51+ for electron beam storage systems in general, subclasses 364+ for cathode-ray tube (CRT) deflection circuits.

377, Electrical Pulse Counters, Pulse Dividers, or Shift Registers: Circuits and Systems, subclass 99 for counters using beam type tubes.

238 Cartesian memories:

This subclass is indented under subclass 230.01. Subject matter wherein all columns (or rows) of a memory plane are addressed simultaneously.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

235, for information stored similarly in optical memories.

SEE OR SEARCH CLASS:

340, Communications: Electrical, 2.2-2.31 for a channel selecting matrix and subclasses 14.1 through 14.69 for a decoder matrix.

238.5 Byte or page addressing:

This subclass is indented under subclass 230.01. Subject matter which addresses a group of memory elements or a plurality of such groups as a single unit.

(1) Note. The information stored in each of such elements often represents a binary digit ("bit") and the information stored in such a group of memory elements represents digital words or bytes.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

220, for a parallel read/write circuit.
230.03+, for addressing of plural blocks or banks of memory.
238, for a Cartesian memory address circuit.

239 Sequential:

This subclass is indented under subclass 230.01. Subject matter where the memory locations are sequenced one after another in an addressing circuit.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

236, for addressing memory locations by counting techniques.
238, for addressing simultaneously all columns (rows) of a memory plane.

240 Using shift register:

This subclass is indented under subclass 239. Subject matter where the means for sequencing is a shift register.

241 Detectors:

This subclass is indented under subclass 239. Subject matter where the memory locations are detected one after another.

242 Current steering:

This subclass is indented under subclass 230.01. Subject matter having means for determining a current or voltage path to select a memory location.

243 Diode:

This subclass is indented under subclass 242. Subject matter where the means is a diode(s).

243.5 Including magnetic element:

This subclass is indented under subclass 230.01. Subject matter in which an address circuit includes a magnetic element.

SEE OR SEARCH THIS CLASS, SUB-CLASS:

225.5, for a read/write circuit having a magnetic element.
230.07, for an address decoder circuit having a magnetic element.

SEE OR SEARCH CLASS:

307, Electrical Transmission or Interconnection Systems, subclasses 401+ for a nonlinear reactor system.
327, Miscellaneous Active Electrical Non-linear Devices, Circuits, and Systems, subclasses 190+ for a stable state circuit utilizing a transformer or saturable core device.
336, Inductor Devices, appropriate subclasses for structure of a magnetic circuit element.

244 MISCELLANEOUS:

This subclass is indented under the class definition. Subject matter not provided for above.

END